



AZPDES

Municipal Stormwater Permit AZS000001-2010

Second Annual Report
September 2013

Prepared By:
The City of Tucson
Department of Transportation
Stormwater Management Section

In Co-operation with:
GENERAL SERVICES
ENVIRONMENTAL SERVICES/HOUSEHOLD HAZARDOUS WASTE
FIRE
HUMAN RESOURCES/CENTRAL SAFETY SERVICES
PARKS AND RECREATION
PLANNING AND DEVELOPMENT SERVICES
TUCSON WATER
TRANSPORTATION/ENGINEERING AND STREETS AND TRAFFIC MAINTENANCE DIVISION
PIMA ASSOCIATION OF GOVERNMENTS
TUCSON CLEAN AND BEAUTIFUL
UNIVERSITY OF ARIZONA

**The City of Tucson's
Stormwater Annual Report
(Fiscal Year 2012–13)**

Table of Contents

| | |
|---|----------|
| Part 1: General Information | 7 |
| Part 2: Annual Report Certification..... | 7 |
| Part 3: Summary of Stormwater Management Activities | 9 |
| Overview..... | 9 |
| I. Public Education and Outreach..... | 9 |
| A. Report Outreach Events and Topics | 9 |
| 1. Stormwater Management Section..... | 9 |
| 2. Planning and Development Services | 10 |
| 3. Tucson Water | 10 |
| 4. Pima Association of Governments | 11 |
| 5. University of Arizona, Cooperative Extension Service | 12 |
| 6. Table I.A.vii Summary of Public Education and Outreach..... | 14 |
| II. Stormwater Public Involvement Program..... | 15 |
| A. Activities, Number of People..... | 15 |
| 1. Stormwater Management Section..... | 15 |
| 2. Household Hazardous Waste | 15 |
| 3. Tucson Clean & Beautiful..... | 15 |
| 4. Table II.A.iv Summary of Public Involvement..... | 16 |
| III. Illicit Discharge Detection and Elimination (IDDE) Program | 17 |
| A. Municipal Employee Training..... | 17 |
| 1. New and Current Employees..... | 17 |
| 2. Specialized Stormwater Training | 17 |
| B. Spill Prevention and Response | 17 |
| 1. Municipal Facility Assessments..... | 17 |
| 2. Identification of Higher Risk Facilities | 17 |
| 3. Spill Tracking | 17 |

| | |
|--|----|
| C. Dry Weather Screening of Major Outfalls | 18 |
| 1. Outfall Inventory | 18 |
| 2. Outfalls Inspected..... | 18 |
| 3. Priority Outfall Inspected..... | 18 |
| 4. Results of Dry Weather Screening..... | 18 |
| 5. Eliminate Illicit Discharges (Cross Connections and Other Sources)..... | 18 |
| 6. Reports of Dry Weather Flows..... | 18 |
| IV. Municipal Facilities Pollution Prevention/Good Housekeeping Program..... | 19 |
| A. Municipal Employee Training | 19 |
| 1. New and Current Employees | 19 |
| 2. Specialized Stormwater Training..... | 19 |
| B. Municipal Facility Assessments | 20 |
| 1. Municipal Facility Inventory | 20 |
| 2. Higher Risk Facilities..... | 21 |
| (a) MAITs Inspections..... | 21 |
| (b) Proper Management of Used Oils and Toxics..... | 21 |
| (c) Controls for Pesticides, Herbicides, and Fertilizers | 21 |
| C. Inspections..... | 22 |
| 1. Prioritizing Areas of MS4 for Inspection | 22 |
| 2. Municipal Facility Assessments | 22 |
| 3. MSGP Facilities | 23 |
| 4. Summary of Follow-Ups | 23 |
| D. Infrastructure Maintenance | 24 |
| 1. Stormdrain System | 24 |
| 2. Roadway System..... | 24 |
| E. Mapping Status | 25 |
| V. Industrial Stormwater Program | 27 |
| A. Municipal Employee Training | 27 |
| B. Status of Inventory..... | 27 |
| 1. Industrial Facility Database | 27 |
| 2. Higher Risk Facilities..... | 27 |
| 3. AZPDES Non-filers..... | 27 |

| | |
|--|----|
| C. Inspections | 27 |
| 1. Inspection Findings..... | 27 |
| 2. Inspect 20% of all Facilities | 28 |
| 3. Enhancing the Industrial Facility Program | 28 |
| VI. Construction Site Controls | 28 |
| A. Municipal Employee Training..... | 29 |
| 1. New and Existing Employee Training..... | 29 |
| B. Planning and Land Development..... | 29 |
| C. Plan Review and Approval | 29 |
| 1. Plan Review | 29 |
| 2. Plan Approval..... | 29 |
| 3. Pre-Construction Meetings | 29 |
| 4. Transportation Projects..... | 29 |
| D. Status of Inventory..... | 30 |
| 1. Permits Plus Database | 30 |
| 2. Smart NOI Database | 30 |
| E. Inspections..... | 30 |
| 1. Inspection Findings..... | 30 |
| 2. Enforcement Actions | 30 |
| 3. Transportation Projects..... | 30 |
| VII. Post-Construction Site Controls | 31 |
| A. Review of Master Plan..... | 31 |
| B. Municipal Employee Training | 31 |
| C. Post-Construction Controls | 31 |
| 1. Inspection of Privately owned Retention/Detention Basins..... | 31 |
| 2. Inspection of 75% of City Permitted Sites..... | 31 |
| D. Compliance Activities/Enforcement | 31 |
| 1. Privately Owned Retention/Detention Basins Enforcement..... | 31 |
| 2. Summary of Follow-up Actions | 31 |

| | |
|--|-----------|
| Part 4: Numeric Summery of Stormwater Program Activities..... | 33 |
| I. Illicit Discharge Detection & Elimination Program | 33 |
| A. Municipal Employee Training | 33 |
| B. Spill Prevention..... | 33 |
| C. Outfall Inspection | 33 |
| D. MS4 Inspections..... | 34 |
| E. Inspection due to Reports of Dry Weather Flow | 34 |
| II. Municipal Facility Stormwater Program | 34 |
| A. Municipal Employee Training | 34 |
| B. Municipal Facility Inventory | 35 |
| C. Inspections..... | 35 |
| D. Infrastructure Maintenance | 35 |
| III. Industrial Stormwater Program | 36 |
| A. Municipal Employee Training | 36 |
| B. Inventory | 36 |
| C. Inspections and Enforcement Actions | 36 |
| IV. Stormwater Construction Program Activities | 36 |
| A. Municipal Employee Training | 36 |
| B. Plan Review | 37 |
| C. Inspections and Enforcement Actions | 37 |
| V. Post Construction Program Activities | 37 |
| Part 5 Evaluation of the Stormwater Management Program..... | 39 |
| Part 6 Stormwater Management Program Modifications..... | 41 |
| Part 7 Monitoring Locations | 43 |
| Part 8 Storm Event Records | 45 |

| | | |
|----------------|--|-----------|
| Part 9 | Summary of Monitoring Data (By Location)..... | 47 |
| I. | Sample Site 1..... | 47 |
| II. | Sample Site 2..... | 51 |
| III. | Sample Site 3..... | 55 |
| IV. | Sample Site 4..... | 59 |
| V. | Sample Site 5..... | 63 |
| Part 10 | Assessment of Monitoring Data | 69 |
| I. | Stormwater Quality..... | 69 |
| II. | Water Quality Standards (WQS) | 69 |
| III. | Exceeding Water Quality Standards (WQS)..... | 69 |
| Part 11 | Estimates of Annual Pollutant Loadings..... | 75 |
| Part 12 | Annual Expenditures..... | 81 |
| Part 13 | Attachments..... | 83 |

Annual Report Form
For Phase I MS4s -Due September 30th Each Year

PART 1: GENERAL INFORMATION

- A. Name of Permittee: City of Tucson
- B. Permit Number: AZS000001-2010
- C. Reporting Period: July 1, 2012 - June 30, 2013
- D. Name of Stormwater Management Program Contact:
Beverley Hester, Environmental Engineer
Mailing Address: P.O. Box 27210
City: Tucson Zip: 85726-7210 Phone: (520) 837-4935
Fax Number: (520) 791-4238 Email Address: Bev.Hester@tucsonaz.gov
- E. Name of Certifying Official: Daryl W. Cole
Title: Director of Transportation
Mailing Address: P.O. Box 27210
City: Tucson Zip: 85726-7210 Phone: (520) 837-6692
Fax Number: (520) 791-4238 Email Address: Daryl.Cole@tucsonaz.gov

PART 2: ANNUAL REPORT CERTIFICATION

The Annual Report Form must be signed and certified by either a principal executive officer or ranking elected official; or by a "duly authorized representative" of that person in accordance with Sections 9.2 and 9.12 of the permit.

I certify under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.



Signature of Certifying Official

9/23/13

Date

PART 3: SUMMARY OF STORMWATER MANAGEMENT ACTIVITIES

Overview

The City of Tucson was covered under Municipal NPDES Stormwater Permit AZS000001 from March 19, 1997 to August 31, 2011. During that time period, the City developed several programs to improve stormwater quality and maintain compliance with the permit. On September 1, 2011, ADEQ issued the City of Tucson AZPDES Stormwater Permit AZS000001-2010. Most of the programs developed under the previous permit are currently utilized to protect stormwater quality. Additional requirements under the new permit are utilized to fine tune the stormwater program. This is the second reporting year of its five-year term. The City has completed the second year requirements as summarized in this annual report.

I. Public Education and Outreach

A. REPORT OUTREACH EVENTS AND TOPICS

This section identifies the City departments involved in public outreach activities that enhance public awareness and understanding of stormwater pollution. In addition to City departments, regional assistance is provided by Pima Association of Governments (PAG) and Tucson Clean and Beautiful. Outreach Topics and numbers reached are presented in Table I.A.i., Stormwater Public Awareness Program Activities.

1. Stormwater Management Section

The Stormwater Management Section's Stormwater Public Awareness Program encourages the public to keep stormwater clean and report stormwater concerns. The program extends to messages about flood safety in addition to promoting the preservation of naturally vegetated washes.

The *Water Harvesting Guidance Manual* is still available on CD, on the City's website, and in hard copy. This guidance manual was designed to assist the development community in complying with Land Use Code requirements to maximize use of water harvesting in new development. Water Harvesting is a low-impact development Best Management Practice (BMP) that promotes infiltration and serves to reduce pollutants in stormwater runoff. In addition, residents with existing homes or businesses can use the *Water Harvesting Guidance Manual* to retrofit their property to harvest stormwater. This year, 107 *Water Harvesting Guidance Manuals* were distributed to the general public.

In the City's ongoing catch basin identification program, catch basins located where there is a high potential for illegal dumping are identified with a weather-resistant metal disk bearing the slogan, "Only Rain in the Drain." The marked catch basins are included on the City's interactive, GIS Stormwater Map that will be included in a future annual report.

In order to inform citizens about the importance of preserving naturally vegetated watercourses, the City has continued a program to install signs identifying washes by name at significant road crossings. If the public is aware of the location and name of their local washes, citizens may be more likely to protect them as a natural resource. The wash signs get damaged periodically and are replaced. These wash sign locations are included in a layer on the City's GIS Stormwater Map.

In this report period, the Stormwater Management Section distributed outreach materials at: Ward IV Back to School Bash, Water Festival, Tucson Children's Earth Day, and Monsoon Safety Awareness Week that were intended to encourage the public to prevent stormwater pollution. The message "Only Rain in the Drain" is used on a variety of promotional give-away materials as listed in Table I.A.i.

The *Desert Wash Safety Activity Book*, which presents basic stormwater quality messages, was provided to younger residents and continues to be popular among elementary schools, recreation centers, libraries and other facilities. These activity books were distributed in both English and Spanish.

Stormwater in the Desert, another book produced by the City that is geared toward students in middle school blends aspects of the *Water Harvesting Guidance Manual* with messages about flood safety and stormwater quality. This middle school activity book introduces students to complex technical concepts and includes interactive activities using the City's website, particularly the MapGuide and Stormwater Management Section websites. During this reporting period, the books were delivered to students and teachers at schools in the Tucson area. The book is keyed to Arizona's educational curriculum guidelines and also includes a Teacher's Guide.

In this report period, Stormwater Management Section continued to distribute construction information packets containing guidance on complying with the AZPDES General Permit for Construction. Topics included are listed in Table I.A.ii.

During the report period, the Stormwater Management Section began a Certificate of Excellence Program to reward industrial facilities demonstrating exceptional effort in complying with Stormwater regulations. In this first year of the program, four facilities received a "Certificate of Excellence." Additionally, the Stormwater Management Section continued to distribute information packets and guidance materials to industrial facilities. The Industrial AZPDES Packet includes information on the No Exposure certification process among other topics as shown in Table I.Aii.

2. Planning and Development Services

The Planning and Development Services Department continued outreach through daily interactions with counter staff, handout materials and monthly meetings with contractors and developers. Post-construction maintenance of retention/detention basins was encouraged through direct mailings and inspections. Table I.A.iii., includes outreach topics and numbers reached.

3. Tucson Water

Tucson Water engages in a wide variety of educational outreach activities intended to increase awareness and encourage citizen action in water-related areas. The training and workshops reported in Table I.A.iv., focused on water harvesting techniques to improve stormwater quality.

4. Pima Association of Governments Stormwater Management Working Group

This year's media campaign was strongly emphasized through the summer monsoon season, but also included some features now available year-round.

The topic of this year's Stormwater outreach campaign was proper management and disposal of used oil and how to clean up spills. Information was provided in the form of ads, articles, interviews, signage, events, social media and promotional/educational materials.

The slogan "Clean Water Starts with Me" became the campaign name in 2008 and continues to gain familiarity. The successful message has been repeated by other entities across the state. Artwork and style complements the imagery used by the local jurisdictions in school programs and "Only-Rain-in-the-Drain" efforts for consistency across the region. New Public Service Announcements (PSAs) and magazine ads were also developed to reach Spanish-speaking populations.

This fiscal year, PAG focused some new outreach on Low Impact Development, most notably through a Watershed Pocket Guide, which devotes an entire section on the back side to rainwater harvesting and green infrastructure. Rainwater harvesting is connected to the pollution message through the messages to keep yard chemicals and sediments on site with grading and by building rain gardens which biologically purify Stormwater of pollutants.

PAG continued to emphasize the importance of proper pet waste disposal in magazine ads, brochures, through trivia questions at outreach events, in a Facebook note and through a Facebook ad. Slogans include "pick up where your dog left off" and "scoop the poop." Stickers with these slogans have been distributed to city and county parks and at outreach venues by PAG and its member jurisdictions. The "scoop the poop" message also reached new audiences through inclusion in the airport display and on the Watershed Pocket Guide.

PAG provides Stormwater pollution prevention outreach to the construction industry and businesses through materials handed out and on the Web. Information is also shared at monthly meetings with the Southern Arizona Homebuilders Association. On May 8, 2013, PAG hosted the *Stormwater Construction Seminar* covering Stormwater regulations for the construction industry. It was attended by 94 participants, 57 percent of whom worked for the municipal sector and used the seminar as training.

Local MS4s participate in meetings held at PAG throughout the year and coordinate Stormwater programs, plan general public outreach, plan construction industry outreach, and share regulatory information.

PAG hosted a joint meeting of the Stormwater Management and Low Impact Development (LID) Working Groups in February 2013 to address green infrastructure/LID projects throughout the region.

Table I.A.v., illustrates the many topics and multiple media used by PAG in this report period to raise awareness of stormwater issues.

5. University of Arizona, Cooperative Extension Service

In the past year, the University of Arizona faculty trained over 2,500 Integrated Pesticide Management (IPM) end users at over 35 meetings, conferences, and workshops. They published at least 50 pest management related extension publications. The number of people who received training is tabulated in Table I.A.vi.

Table I.A.i

| City of Tucson-Department of Transportation | | |
|---|---|--------|
| Target Group | Outreach Materials | Number |
| General Public | • Water Harvesting Guidance Manual | 107 |
| | • Catch basins marked “Only Rain in the Drain” | 1,863 |
| | • Wash identification signs | 586 |
| | • Swimming Pool Discharge Flyer | 10 |
| | • Yard and Landscape Waste Disposal brochure | 25 |
| | • Leaky vehicle flyer | 25 |
| | • Promotional materials given away at Public Outreach Events | 2,000 |
| | ○ August 4 – Ward IV Back to School Bash | |
| | ○ March 8 – Water Festival | |
| Elementary Schools | • <i>Desert Wash Safety Activity Book</i> for grade school children | 1,117 |
| | ○ Stormwater runoff issues and residential stormwater management practices | |
| | ○ Illicit discharges and illegal dumping | |
| Middle Schools | • <i>Stormwater in the Desert</i> book for middle school children and interactive website | 550 |
| | ○ Stormwater runoff issues and residential stormwater management practices | |
| | ○ Potential water quality impacts of application of pesticides, herbicides and fertilizer | |
| | ○ Potential impacts of animal waste on water quality | |
| | ○ Illicit discharges and illegal dumping | |
| | ○ Spill prevention, proper handling and disposal of toxic and hazardous materials | |
| | ○ Proper management and disposal of used oil | |

Table I.A.ii

| City of Tucson-Department of Transportation | | |
|---|---|---------|
| Target Group | Outreach Materials | Number |
| Construction Site Operators, Development Community | <ul style="list-style-type: none"> Construction information packets | 1 |
| | <ul style="list-style-type: none"> Planning ordinances and grading and drainage design standards for stormwater management in new developments and significant redevelopments | |
| | <ul style="list-style-type: none"> Municipal stormwater requirements and management practices for construction sites | |
| | <ul style="list-style-type: none"> Illicit discharges and proper management of non-stormwater discharges | |
| | <ul style="list-style-type: none"> Spill prevention, proper handling of toxic and hazardous materials, and measures to contain and minimize discharges to the storm sewer system | |
| | <ul style="list-style-type: none"> Proper management and disposal of used oil and other hazardous or toxic materials, including practices to minimize exposure of materials/wastes to rainfall and minimize contamination of stormwater runoff | |
| | <ul style="list-style-type: none"> Stormwater management practices, pollution prevention plans, and facility maintenance procedures | |
| Industrial Commercial Businesses | <ul style="list-style-type: none"> Industrial Information packets | 15 |
| | <ul style="list-style-type: none"> Illicit discharges and proper management of non-stormwater discharges | |
| | <ul style="list-style-type: none"> Spill prevention, proper handling of toxic and hazardous materials, and measures to contain and minimize discharges to the storm sewer system | |
| | <ul style="list-style-type: none"> Proper management and disposal of used oil and other hazardous or toxic materials, including practices to minimize exposure of materials/wastes to rainfall and minimize contamination of stormwater runoff | |
| | <ul style="list-style-type: none"> Stormwater management practices, pollution prevention plans, and facility maintenance procedures | |
| Subtotal Reached: | | 6,299 |
| Cost: | | \$7,521 |

Table I.A.iii.

| City of Tucson -Planning and Development Services | | |
|---|--|---------|
| Target Group: | Development Construction | |
| | Outreach Materials | Number |
| | <ul style="list-style-type: none"> 12 Monthly Outreach meetings, approximately 15 attendees | |
| Subtotal Reached: | | 15 |
| Cost: | | \$1,200 |

Table I.A.iv.

| City of Tucson -Water | | |
|-----------------------|--|----------|
| Target Group: | General Public | |
| | Outreach Materials | Number |
| | <ul style="list-style-type: none"> Rainwater Harvesting Manuals (several hundred distributed) | 2,000 |
| | <ul style="list-style-type: none"> Rainwater Harvesting Rebate (flyer in water bill) | 353,000 |
| Target Group: | General Public | |
| | Outreach Materials | |
| | <ul style="list-style-type: none"> 58 "Water-Wise Landscaping" Workshops | 1,400 |
| Subtotal Reached: | | 356,400 |
| Cost: | | \$81,800 |

Table I.A.v.

| Pima Association of Governments | | | |
|--|---|-------------------|---------------|
| Target Group: | Construction Industry | | |
| | Outreach Materials | | Number |
| • | Monthly meetings with the Southern Arizona Homebuilders Association | | 15 |
| • | PAG Stormwater website hits | | 232,441 |
| ○ | Erosivity Calculator | | |
| ○ | Example SWPPPs | | |
| ○ | Inspection Checklists | | |
| ○ | Local Contacts | | |
| ○ | Links to City's Stormwater Ordinance | | |
| Target Group: | General Public | | |
| | Outreach Materials | | |
| • | Dog poop stickers | | 1,384 |
| • | Public service announcements (PSA's) | | 923,000 |
| • | Magazine ads | | 1,800,000 |
| • | Brochures | | 850 |
| • | Bus interior posters (250 posters, 1 per bus, 45,000 people/day) | | 45,000 |
| • | Webpages and social media | | 1,000,000 |
| • | Displays at events | | 1,000 |
| • | Rack cards and pocket guides | | 4,770 |
| • | Bumper stickers | | 2,300 |
| • | Vehicle magnets | | 10 |
| • | Sunshades | | 300 |
| | | Subtotal Reached: | 2,228,800 |
| | | Cost: | \$23,408 |

Table I.A.vi.

| University of Arizona, Cooperative Extension Service | | | |
|---|--|-------------------|---------------|
| Target Group: | General Public | | |
| | Outreach Materials | | Number |
| • | Proper use of fertilizer, insecticides, herbicides, and other pesticides | | 200 |
| • | Integrated Pesticide Management (IPM) | | 2,500 |
| | | Subtotal Reached: | 2,700 |
| | | Costs: | Unknown |

6. Table I.A.vii Summary of Public Education and Outreach

| Table | Jurisdiction | Reached | Costs |
|----------------|--|------------------|------------------|
| I.A.i/ii | City of Tucson -Transportation Department | 6,299 | \$7,521 |
| I.A.iii | City of Tucson -Planning and Development Services Department | 15 | \$1,200 |
| I.A.iv | City of Tucson -Water Department | 356,400 | \$81,800 |
| I.A.v | Pima Association of Governments | 2,228,800 | \$23,408 |
| I.A.vi | University of Arizona -Cooperative Extension Service | 2,700 | Unknown |
| TOTALS: | | 2,594,214 | \$113,929 |

II. Stormwater Public Involvement Program

A. ACTIVITIES, NUMBER OF PEOPLE

1. Stormwater Management Section

The City of Tucson Stormwater Management Section website contains a contact page allowing citizens to “Report a Concern,” including spills that threaten to enter the storm-drain system, dry weather flows, construction or industrial site runoff, and illegal dumping in stormdrains or washes. The City website received hits that are listed in Table II.A.i.

2. Household Hazardous Waste

During this reporting period, the Household Hazardous Waste Collection (HHW) program distributed outreach materials to the General Public through direct mailings, handouts at public events, and facilities on topics listed in Table II.A.ii. In addition, the program provided information to businesses through their Small Business Waste Assistance Program. Educational materials provided to the public included a brochure describing the collection site locations, hours of operations, and tips on how to reduce environmental impacts.

This year the Household Hazardous Waste Program moved one of its first Saturday of each month collection events to the second Saturday of each month. It is open from 8:00 AM - noon. This change provides additional days where the public can properly dispose of their household hazardous materials. The Household Hazardous Waste Program also assumed the administration of the household hazardous waste drop off site, formerly known as ABOP, at the Los Reales Landfill and now offers recycled latex paint for sale at this location. The household hazardous waste drop off at the Los Reales Landfill is open Monday-Saturday, 6:30 AM - 5:00 PM. This and the operating costs for this reporting period are listed in Table II.A.ii.

3. Tucson Clean & Beautiful

Through the Adopt a Park and Public Areas program, over 260 public areas in the Tucson area have been officially adopted by community volunteer groups. Volunteer removal of litter and illegally dumped material from public areas helps to reduce impacts to stormwater quality.

Trees for Tucson provided shade trees to the public to help trap pollutants to improve water quality, stabilize soil, and prevent soil erosion.

Tucson Clean and Beautiful provided periodic email newsletters and maintained their website. These online resources were complemented by phone, in person and in brochure format, highlighting local environmental education events and community volunteer opportunities. These programs, as well as the central message of Tucson Clean and Beautiful, encourage the public to act responsibly in ways that improve and promote stormwater quality. Table II.A .iii, below provides an overview of the scope and audience of their program.

Table II.A.i.

| Stormwater Management Section | | | |
|--------------------------------------|--|-------------------|---------------|
| Target Group: | General Public | | |
| | Outreach Materials | | Number |
| • | Stormwater Section website “Report a Concern” web hits | | 326 |
| | | Subtotal Reached: | 326 |

Table II.A.ii.

| Household Hazardous Waste (HHW) | | | |
|--|---|------------------------|---------------|
| Target Group: | General Public | | |
| | Outreach Materials | | Number |
| • | Brochures (printed) on properly disposing of auto fluids, batteries, paints, and solvents, pool chemicals, and pesticides | | 4,000 |
| • | HHW webpage visits | | 26,531 |
| • | News releases on HHW Collections | | 3 |
| Target Group: | General Public | | |
| | Outreach Materials | | |
| • | Household Hazardous Waste Collection Program (Participants in the program) | | 33,301 |
| ○ | ABOP (HHW) drop-off sites (Participants in the program) | | 17,039 |
| Target Group: | Small Businesses | | |
| | Outreach Materials | | |
| ○ | Small Business Waste Assistance Program (Participants in the program) | | 169 |
| | | Subtotal Participants: | 50,509 |
| | | Subtotal Program Cost: | \$719,380 |

Table II.A.iii.

| Tucson Clean and Beautiful | | | |
|-----------------------------------|---|------------------------|---------------|
| Target Group: | General Public | | |
| | Outreach Materials | | Number |
| • | Newsletter | | 4,500 |
| • | Website | | 35,800 |
| • | Outreach presentations and event participants | | 9,116 |
| Target Group: | General Public | | |
| | Outreach Materials | | Number |
| • | Adopt a Park and Public Areas, including Streets and Washes (Participants in the program) | | 3,370 |
| • | Trees for Tucson Program | | |
| ○ | Households Receiving Trees – Reduces soil erosion, improves stormwater quality | | 1,591 |
| | | Subtotal Participants: | 54,377 |
| | | Subtotal Program Cost: | \$141,190 |

4. Table II.A.iv Summary of Public Involvement

| Table | Jurisdiction | Reached | Costs |
|----------------|--|----------------|------------------|
| II.A.i | City of Tucson –Transportation Department-Stormwater | 326 | 0 |
| II.A.ii | City of Tucson –Household Hazardous Waste | 50,509 | \$719,380 |
| II.A.iii | Tucson Clean and Beautiful | 54,377 | \$141,190 |
| TOTALS: | | 104,886 | \$860,570 |

III. Illicit Discharge Detection and Elimination (IDDE) Program

A. MUNICIPAL EMPLOYEE TRAINING

1. New and Current Employees

New City employees received training from Central Safety Services on topics including: spill prevention and response, proper storage, handling and disposal of used oil and other toxics, reporting spills, reporting spills that threaten the stormdrain system, and reporting suspicious non-storm flows. This training was provided at orientation in the “City of Tucson Employee Safety Handbook.” Existing City employees attended training through “City Learn,” an online program that allows staff to take training individually. Therefore, no dates are reported. The specialized 40 hour Hazardous Waste Operations and Emergency Response (HAZWOPER) training was provided to fire personnel. The 8-hr HAZWOPER refresher training is taken annually by Stormwater, Tucson Water, and Environmental Services staff. The numbers of employees trained are tabulated in Part 4.

2. Specialized Stormwater Training

The stormwater team participates in weekly training/discussion sessions. The focus varies on all activities related to the stormwater program. These activities include complaints, sanitary sewer overflows, illicit discharges, sampling activities, sample results and action needed, field screen outfall investigations, MAITs inspection, industrial inspections, procedures, policies, and enforcement protocol.

B. SPILL PREVENTION AND RESPONSE

1. Municipal Facility Assessments

During this Fiscal Year 2012-13, the Stormwater Management Section has assessed City owned and operated facilities for the presence of materials which have the potential to impact stormwater quality, and has prioritized these facilities based on the risk of these impacts. The City utilizes a Multi-Agency Inspection Team (MAITs) to perform annual inspections of all City owned and operated facilities. The team consists of representatives from City agencies with expertise in Industrial Hygiene, Occupational Safety and Health Administration (OSHA) Compliance, Risk Management, Fire Code, and Stormwater. Facility assessments have been conducted in conjunction with the MAITs inspections, and were focused on determining the potential for each facility to impact stormwater quality.

2. Identification of Higher Risk Facilities

The City continues to review and prioritize the list of municipal facilities annually, and will begin inspecting the “higher risk” facilities every two years, beginning in FY 2013-2014 (year three of the permit term), and will report on any issues found which required follow-up. Control measures are currently in use to minimize potential stormwater exposure.

3. Spill Tracking

Several years ago, the City developed a Spill Response Program, S-020C, that it uses to provide direction on how to handle spills. Part of the program includes tracking of the number of spills that occurred. This year, 12 spills were reported to Environmental Services, as required by the program.

C. DRY WEATHER SCREENING OF MAJOR OUTFALLS

1. Outfall Inventory

In the early 1990s, the City of Tucson followed the procedures outlined in 40 CFR 122.26 to identify 500 outfalls which have been subsequently utilized to detect non-storm flows. Twenty-one outfalls have been added this year. These outfalls have been mapped on the City's Geographic Information System (GIS) Stormwater Map. A map showing the 521 outfalls will be included in PART 13 (Attachments) by the 4th year report.

2. Outfalls Inspected

In this report period, the Stormwater Management Section conducted dry weather outfall screening inspections of 127 outfalls.

3. Priority Outfall Inspected

During this year, 13 priority outfalls were identified, inspected, and added to the field screening outfall map. The priority outfalls are inspected annually. The locations of the priority outfalls are upstream from Lakeside Lake in the Atturbury Wash Watershed. There were no dry weather flows found at any of these outfall locations.

4. Results of Dry Weather Screening

Of the 127 outfall inspections conducted, none of the outfalls had flow, nor were any referred to the Streets Department for repair of concrete, soil erosion, or removal of excess debris. Information collected during dry weather field screening is recorded and tracked through the Field Screen Outfall Database.

5. Eliminate Illicit Discharges (Cross Connections and Other Sources)

Within City owned parks, there are approximately 32 miles of drainage channel/washes. The City annually inspects key areas of the stormdrain system located outside of City owned parks for the presence of illicit discharges.

6. Reports of Dry Weather Flows

In this report period, the City received 123 reports of dry weather flow and responded to all of them. The reports were received from citizens, other City Department staff, Ward office staff, and people from other agencies. Reports of dry weather flow are considered to be a priority for inspection. Investigations conducted revealed that the source water originated from a variety of sources including: pool draining, pool back-flushing, grey water, as well as sanitary sewer overflows and line break releases from potable water, and reclaimed water.

Of the discharges reported from sanitary sewer systems 40 originated from private systems and 11 originated from public sanitary sewer overflows. The flows were from overflowing cleanouts, manholes, broken pipes, or grease traps. One Notice of Violation was given. Three of the public sanitary sewer overflows entered a wash or stormdrain. Each sanitary release was properly cleansed and sanitized.

For other dry weather flows inspected, 11 were called in as “uncharacterized complaints.” This means they are from unidentified sources causing the flow. Nine were non-SWPPP construction complaints that resulted in verbal warnings for improved site controls. Seven complaints involved washes including two verbal warnings, and four leaking vehicle complaints. Eleven were commercial complaints that were inspected. Three verbal warnings were given for discharges. Four spills were responded to, however, none of them entered a stormdrain or wash.

Fourteen inspections resulted in verbal warnings and flyers were provided for swimming pool discharges onto an unpaved right-of-way. The pool operator/discharger was directed to remove the discharge pipe or hose from the alley, and keep future filter back-wash water on private property. Ten pool discharge flyers were left at properties where there was no initial response to an inspector’s visit.

IV. Municipal Facilities Pollution Prevention/Good Housekeeping Program

A. MUNICIPAL EMPLOYEE TRAINING

1. New and Current Employees

All new City employees attend orientation where they each receive a “Safety First Manual.” This employee safety manual includes details on what to do with spills. This report year there were 485 new employees that attended orientation. Additionally, City employees attend mandatory OSHA training during their first year and ongoing employees receive OSHA training every other year through the City’s online program entitled “City Learn.” The numbers of employees trained are tabulated in Part 4. Because classes are taken individually, no dates can be reported for the majority of employees. For those employees who do not have access to a computer, the City Learn training is conducted in a class setting. OSHA training for City of Tucson employees included the following key subject areas. However, this material has been removed, but efforts to restore it are in progress:

- Spill Training: Topics covered include prevention, response, and practices to prevent or minimize spills or discharges to the City’s stormdrain system.
- Proper Handling, storage, transport and disposal of used oil and other toxics and hazardous materials and wastes to prevent spills, exposure to rainfall, and contamination of stormwater runoff.

More extensive training on these subjects is provided for first responders and staff who routinely work with hazardous or toxic products. New employees receive the preliminary 40 hours HAZWOPER training, and existing employees receive the HAZWOPER refresher classes.

2. Specialized Stormwater Training

Stormwater Management Section staff receive extensive training during their first year of employment and refresher training every other year. New Stormwater employees each receive a copy of the Stormwater Ordinance (SWORD), the Stormwater Management Plan

(SWMP), the Watercourse Maintenance Guidelines, and any applicable ordinances and regulations. However, this year we did not have any new employees

The Stormwater Management Section employees (four) received training at the 2013 Seminar “Stormwater Regulations for the Construction Industry” hosted by Pima Association of Governments on May 8, 2013. Three stormwater employees received pH meter training provided by ThermoFisher Scientific on April 1, 2013. Additionally, two stormwater inspectors participated in the following training;

- OSHA Annual 8 hour Refresher
- State of Arizona General Pesticide 6 hour CEU (March 27, 2013)
- 8 hour HAZWOPER refresher (May 29, 2013)
- Industrial Stormwater Compliance Training (June 20, 2013)
- Certified Stormwater Inspector NPDES (June 24 – 25, 2013)

The Industrial Stormwater Compliance training focused on MSGP 2010 enforcement, control measures, visual assessments, training, record keeping, and routine self-inspections. The Certified Stormwater Inspection Training focused on the Clean Water Act, industrial permit compliance, MS4 permit compliance, Arizona construction general permit, NPDES construction standards, and post construction standards.

The Stormwater Management Section conducts and attends weekly training that focuses on the following:

- Stormwater enforcement protocol and compliance
- Incident reporting requirements (24-hour ADEQ report form)
- Stormwater Management Section Compliance Protocol
- Evaluating sites near impaired waters
- City of Tucson Stormwater Management Plan deliverables and requirements.

On-going training for Planning and Development Services Department Stormwater staff includes frequent review and discussion of City Ordinances, development standards, and stormwater regulations. New staff are trained by existing staff in a mentoring process. In this report period, three staff members received training at the 2013 Seminar “Stormwater Regulations for the Construction Industry” hosted by Pima Association of Governments on May 8, 2013.

B. MUNICIPAL FACILITY ASSESSMENTS

1. Municipal Facility Inventory

To date, the City has identified 203 City owned and operated facilities. During this fiscal year, the following information has been added to the inventory: latitude/longitude, facility contact, the operational status (operating or closed), the Standard Industrial Classification (SIC) code(s) that best reflects the services provided by each facility and a brief description of operational practices that could potentially impact stormwater quality. The City will investigate adding information from the inventory to the GIS Stormwater Map.

2. Higher Risk Facilities

(a) MAITs Inspections

This fiscal year, the stormwater inspector assigned to the MAITs inspection team assessed the potential of City owned and operated facilities to impact stormwater quality. The City prioritized municipally owned facilities based on the following criteria:

- Proximity to Lakeside Lake, an impaired water
- Need for an MSGP
- Potential for impacting stormwater quality based on:
 - Quantity and location of materials used and/or stored at the facility;
 - Potential for exposure to stormwater; and
 - Potential to discharge a substantial pollutant load to the MS4 or to a water of the U.S.

Seven City facilities that don't need an MSGP were considered higher risk during this reporting period. These were: Thomas O. Price Service Center, Fred Enke, El Rio, Silverbell, and Randolph Golf Courses, Fire Department Maintenance (HAZMAT) and Household Hazardous Waste. Additionally, facilities with an MSGP are considered higher risk. They are: Los Reales Landfill, (AZMSG-61695), Sun Tran Bus Terminal AZMSG-61745, Sun Tran Bus Terminal Northwest AZMSG-61747, Sun Van AZMSG-61746.

(b) Proper Management of Used Oils and Toxics

The Tucson Fire Department manages the City of Tucson Hazardous Waste Disposal Program, a citywide program to ensure proper handling and disposal of all toxic wastes generated by City operations. The General Services Department, located at Thomas O. Price Service Center, has an automotive fluids handling procedure to contain fluids in designated storage areas.

(c) Controls for Pesticides, Herbicides, and Fertilizers

Responsibility for proper storage and application of pesticides, herbicides, and fertilizers at City owned facilities is shared by two City Departments, City of Tucson Parks and Recreation Department, and the City of Tucson Department of Transportation, Streets and Traffic Maintenance Division. Proper storage practices in terms of stormwater BMPs are verified during annual Multi-Agency Inspection Team (MAITs) inspections. Separate costs for implementation of these controls are limited or were not available at the time of this report.

C. INSPECTIONS

1. Prioritizing Areas of MS4 for Inspection

The City of Tucson, Department of Transportation, Streets and Traffic Maintenance Division shares responsibility for inspection and maintenance of the City's MS4 Drainage System with the City Parks and Recreation Department. The drainage channels/washes located within City owned parks are considered priority and are normally inspected once a year. Based on system history, citizen complaints, and known maintenance concerns, the City annually inspects key areas of the stormdrain system located outside of City owned parks for the presence of illicit discharges, excess sediment, litter, debris or other pollutants that may obstruct flow or be transported in stormwater. In this report period, the City considered 394 miles of the MS4 outside of City owned parks as priority and 294 miles of these were inspected. In addition, Parks and Recreation performed inspections on 47 miles of the City's drainage within City Parks. A total of 341 miles of the City's MS4 were inspected in this report period.

2. Municipal Facility Assessments

The City's Multi-Agency Inspection Team (MAITs) conducts annual inspections of all City owned and operated facilities, and in this report period, MAITs inspected 203 of these facilities. As required, follow-up inspections were made to verify that corrections had been made. During this fiscal year, the Stormwater Inspector assigned to MAITs has performed assessments of City facilities to determine if five or more gallons of potential stormwater pollutants are stored in areas exposed to stormwater. Based on this assessment, on the types of activities performed, material stored, and proximity to receiving waters, the City has determine which of these facilities are considered high risk.

The City of Tucson Environmental Services owns and maintains 15 closed landfills and one active landfill - Los Reales. Los Reales Landfill operates under the MSGP 2010 and was issued authorization number AZMSG-61695 on May 31, 2011. The Los Reales Landfill Stormwater Pollution Prevention Plan (SWPPP) was written in accordance with the MSGP 2010. The City of Tucson Environmental Services Department conducts quarterly inspection of the closed landfills. Annually, the City of Tucson Department of Transportation Stormwater Management Section inspects both open and closed landfills for stormwater regulatory compliance. On June 13, 2012, the City conducted an inspection of Los Reales Landfill. This inspection is an additional measure to ensure that pollutants from landfills and municipal waste facilities are controlled. No violations or concerns were noted during the inspection of Los Reales Landfill. The Los Reales Landfill is maintained in good operating condition.

The Stormwater Management Section and the Environmental Services Department conduct a joint annual inspection of the 15 closed landfills. The inspection is scheduled for October of this year. The results of the inspection will be reflected on the next annual report. The City is in the process of placing a permanent cap on the Tumamoc landfill and it is projected to be completed this fall.

The City's fleet maintenance facility, Thomas O. Price Service Center, is not regulated under an MSGP however, it is covered under the City's MS4 permit. The Thomas O. Price Service Center maintains a SWPPP and has a Stormwater Pollution Prevention Team that conducts quarterly stormwater inspections of the facility. The Stormwater Management Section conducts annual inspections of the Service Center. The facility was inspected on June 28, 2013 and no violations were found other than minor improvements in good housekeeping. These were addressed at the time of inspection.

3. MSGP Facilities

To date, the only city owned and operated facility that qualifies for coverage under the Multi-Sector General Permit is Los Reales Landfill. Los Reales is covered under authorization number AZMSG-61695; however, as an additional landfill control measure, Los Reales is inspected annually by the Stormwater Management Section.

There are three City of Tucson owned transit facilities that are privately managed and staffed. They are two Sun Tran Bus Maintenance Facilities and the Sun Van Facility that are operated under separate MSGP 2010 permits. These facilities were inspected on October 25, 2012, and the SWPPP for each facility was reviewed to ensure compliance with the MSGP 2010. All three facilities provided records of annual stormwater training. Only minor housekeeping issues were identified during inspections and were immediately addressed. The MSGP permit numbers for these facilities are listed below.

- Sun Tran Bus Terminal AZMSG-61745
- Sun Tran Bus Terminal Northwest AZMSG-61747
- Sun Van AZMSG-61746

4. Summary of Follow-Ups

Concerns noted during FY 2012-13 MAITs inspections of municipally owned and operated facilities were at 15 City facilities. The concerns were for the following deficiencies: secondary containment was not used or needed to be cleaned-out, leakage of automotive fluids from unused equipment, contaminated soil needed to be removed, waste cooking oil/grease containers required relocation or adequate covers. One location required a spill kit, clean-out a non-draining inlet, two stormdrain inlet covers needed replacements, two stormdrain inlets needed cleaning, and removal of small quantities of hazardous waste stored outside.

During the City facility inspections, minor adjustments to good housekeeping practices were recommended and usually addressed during the inspection. All inspections included a representative of the facility to observe any deficiency. Reports were sent to the facility managers and the responsible party. The report described the deficiencies and included instructions to notify the MAITs team, within 30 days of the corrective action, or to provide an abatement schedule. Follow-up inspections were conducted to verify that appropriate actions were taken to resolve concerns.

D. INFRASTRUCTURE MAINTENANCE

1. Stormdrain System

- **Miles visually inspected:**
Within City Parks, approximately 47 miles of linear drainage channels/washes were inspected. Outside Parks, City Street and Traffic Maintenance Inspectors inspected 294 miles of drainage channels/washes. Stormwater Inspectors inspected an additional 29 miles of stormdrain /washes. In total, approximately 318 linear miles of the City's MS4 were inspected.
- **Miles Cleaned or Debris Removed:**
In this report period, approximately 99 miles of drainage channel outside City parks were cleaned and no drainage channels within City parks were cleaned.
- **Cleaning of Closed Conduit:**
Contracted vactor services are utilized whenever there is need to clean City-owned closed conduit facilities. During this reporting period, approximately 0.05 linear miles of closed conduit were cleaned within City of Tucson owned Parks.
- **Retention/Detention Basins Cleaned:**
Accumulated sediments and debris in retention/detention basins are removed seasonally, or as necessary, contingent on flow. During this reporting period, ten Retention/Detention basins located in City owned Parks, and five located elsewhere were cleaned.
- **Number of Catch Basins Identified:**
The City identified 1,000 catch basins.
- **Number of Catch Basins Cleaned:**
Nine catch basins within City parks and 17 outside City parks were cleaned.

2. Roadway System

- **Street and Parking Lot Sweeping Program:**
The Streets and Traffic Maintenance Division's current schedule for street sweeping for major arterial and collector streets is twice monthly, and sweeping streets in the central business district is three times each week. These priorities are reassessed annually. Street and parking lot sweeping in public parks is conducted through the Parks & Recreation Department.
- **Broom Miles:**
The Streets and Traffic Maintenance Division swept 31,052 broom miles of roadways and Parks and Recreation Department swept 3.55 miles of park paths.
- **Total Waste Collected:**
The total amount of waste collected from Streets and Traffic Maintenance Division sweeping was 8,856 tons and 122 cubic yards was collected by Parks and Recreation Department.

E. MAPPING STATUS

The City's GIS mapping system is formatted as an Environmental Systems Research Institute (ESRI) Geodatabase feature class North America Datum of 1983 (NAD83) High Accuracy Reference Network (HARN) in State Plane Arizona Central Fips 0202 International Feet. The GIS based Stormwater Map, <http://maps.tucsonaz.gov/stormwater> currently contains the following information:

- Linear Drainage Structures: Line layer showing the location of stormwater system pipes. The direction of flow can be determined based on the topographic layer.
- Stormdrain Grates and Catch Basins: Point layer showing the locations of stormdrain grates and catch basins.
- Outfalls: Point layer showing the location of all major outfalls (field screen locations); polygon layer showing the drainage area associated with each of the five sampling sites where stormwater is monitored.
- Detention/Retention Basins: Point or polygon layer showing the locations of all identified City-owned retention and detention basins.
- Jurisdictional Boundary: Line or polygon layer showing the jurisdictional boundaries of the MS4, including any new land annexations during the permit term.

During the first four years of this permit, the City will incorporate mapping of additional features identified in the new MS4 permit. Completion of this effort is anticipated by September 30, 2015. In addition, the City will complete a study evaluating the costs, methods and time needed to further develop the City's GIS Stormwater Map. This study will also be completed by September 30, 2015.

V. Industrial Stormwater Program

A. MUNICIPAL EMPLOYEE TRAINING

The Stormwater Management Section did not hire anyone in this reporting year. However, current employees meet weekly to discuss stormwater activities and review/develop procedures. Two stormwater staff participated in Industrial Stormwater Compliance Training June 20th, 2013 and obtained their certification.

B. STATUS OF INVENTORY

1. Industrial Facility Database

The Stormwater Management Section maintains a database of Industrial and Commercial facilities that have the potential to discharge pollutants to the City's storm sewer system. Currently the list consists of 247 facilities that are targeted by the Multi-Sector General Permit (MSGP). In this report term, the Stormwater Management Section reviewed the list, added a brief description of the facilities' activities and re-evaluated non-targeted facilities to determine if these pose a significant threat to stormwater quality. The Industrial Facility database currently includes the following facilities:

- Industrial facilities identified in 40 CFR 122.26(d)(2)(iv)(C);
- Industrial facilities subject to MSGP requirements, including those facilities that have submitted for a no exposure exclusion; and
- Other industrial and commercial sources (or categories of sources) that the City has inspected over the last permit term.

2. Higher Risk Facilities

During this reporting period, the Stormwater Management Section identified 33 higher risk facilities that are more likely to be sources of stormwater pollution. The priority list was re-evaluated and risk assessment was based on the type of facility, the products or services provided by the facility, proximity to receiving waters, receiving water quality, and other factors that indicate the potential to impact water quality.

3. AZPDES Non-filers

The City implemented a program to determine whether or not a facility has obtained coverage under the Arizona Multi-Sector General Permit. When the City identifies a facility that has not obtained the required coverage, the City will report that facility's location and information to the ADEQ Unit Manager, Field Services Unit, Water Quality Compliance Section semi-annually, by June 30 or December 31.

C. INSPECTIONS

1. Inspection Findings

During the facility inspections, recommendations were made to improve control measures to assure permit compliance. There were no enforcement incidents that required court action. All corrective actions were minor and corrected at the time of inspection or, if needed, were corrected by the time of a scheduled re-inspection. Notable corrections made at inspected facilities included the following:

- Obtaining required MSGP.
- Placing secure lids on 55-gallon drums and relocate to areas with overhead protection and secondary containment.
- Create a facility SWPPP and/or update a facility SWPPP.
- Improve housekeeping at fueling areas by cleaning spills with absorbents and having spill kits stationed at fueling areas.
- Relocate fleet wash areas to prevent run-off into the MS4.
- Improve control measures/BMP's at material storage areas to prevent discharges into MS4.
- Install control measures to prevent discharges into the MS4.
- Improve general housekeeping by cleaning spills promptly, training employees, and having spill kits available at work areas.

2. Inspect 20% of all Facilities

In this report period, the City changed the inspection report by including more detail including photographs and summaries. This detail ensures the owner and operator clearly understand what recommendations need to be applied. Additionally, the focus was on facilities of higher risk that take much longer to complete than those of low risk. As a result, the minimum of 20% inspected was not achieved. The City inspected 44 facilities targeted under the MSGP. This total is 18% of all of the MSGP targeted facilities in the Industrial Facility Database. Of the 33 high risk facilities, 13 were inspected. During the next report period, the City will be reviewing and revising the facility list, and will ensure that a minimum of 20% of facilities on the database receive inspections.

3. Enhancing the Industrial Facility Program

During the permit term, the Stormwater Management Section will evaluate alternatives for enhancing the industrial commercial stormwater program with the goal of increasing field presence through increased numbers of inspections and increasing interaction with commercial and industrial facilities through outreach or other innovative measures.

During this report period the Stormwater Management Section continued educating facility operators on the MSGP 2010 and the sector specific requirements for their respective industry. During facility inspections, additional time was dedicated to discuss and explain the MSGP 2010 and sector specific requirements. This was performed to assist facility operators to be in compliance with stormwater regulations. Also, stormwater inspectors attended industrial facility inspection training and received Stormwater Inspector Certification. In addition, a certificate of excellence program was created for industrial facilities that have displayed commendable compliance with Stormwater Regulations. Four facilities were awarded the certificate this report period; LB Foster, Friedman Recycling, Desert Metal Works, and Arizona Canning Company.

VI. Construction Site Controls

A. MUNICIPAL EMPLOYEE TRAINING

1. New and Existing Employee Training

The Stormwater Management Section did not hire anyone in this report period. New Stormwater Management staff receive extensive training during their first year. Stormwater training incorporates both SWPPP review and inspections. An emphasis on cross training allows a small staff to fill in as needed to meet fluctuations in workload. They receive extensive written materials, such as, a copy of the Stormwater Ordinance (SWORD), the Stormwater Management Plan, the Watercourse Maintenance Guidelines, a copy of the AZPDES Construction General Permit, and any applicable ordinances and regulations and outreach materials for stormwater management for construction facilities.

B. PLANNING AND LAND DEVELOPMENT

The City recognizes the need to understand Low Impact Development (LID) and Green Infrastructure Practices (GI). The City has recently completed a “Green Streets Active Practice Guidelines” for City streets construction projects.

C. PLAN REVIEW AND APPROVAL

1. Plan Review

Following SWPPP review and plan approval, the Planning and Development Services Department (PDSD) issues grading and building permits.

2. Plan Approval

Verification that the SWPPP and Notice of Intent to Discharge (NOI) are complete is a requirement for the issuance of a grading permit. SWPPPs were submitted and reviewed and ground disturbing permits were issued that met the AZPDES Construction General Permit eligibility requirements.

3. Pre-Construction Meetings

Planning and Development Services Department (PDSD) holds pre-construction meetings for private construction projects. The meeting provides an opportunity to review the City’s requirements that includes the requirement to provide a copy of ADEQ’s authorization document at the preconstruction meeting. Other requirements are aimed at ensuring the contractor understands the stormwater controls to be utilized for sites disturbing one or more acres.

4. Transportation Projects

The Department of Transportation administers the construction of roads and stormdrains within the publicly owned right-of-ways. The Stormwater Management Section reviews plans and ensures the SWPPPs for these projects meet all the requirements of the Arizona Construction General Permit. The City does not issue a Notice to Proceed until a copy of ADEQ’s authorization document is received.

In addition to administering construction, the Department of Transportation, Permits and Codes Section issues Right-of-Way (ROW) use permits for private activities, including utility work, that takes place within City owned right-of-ways and insures that ROW and Public Improvement projects meet the requirement for an AZPDES Construction General Permit. All required SWPPPs were reviewed and approved prior to the start of work.

D. STATUS OF INVENTORY

1. Permits Plus Database

The City continues to utilize the Permits Plus Database to track private development activities and inspections. Information in the database includes: requirements for a Construction General Permit, plan and SWPPP review comments, number of submittals, site location, construction inspections, enforcements and other information. This database is continually updated as plans are submitted and reviewed, permits are issued, and construction sites are inspected.

2. Smart NOI Database

A search is performed annually through ADEQ's NOI Construction Stormwater General Permit Database for permits the City has filed. Expired permits or finished projects are noted and the City's signatory is notified to file a Notice of Termination (NOT) with ADEQ.

E. INSPECTIONS

Many construction projects are small and do not come under the AZPDES requiring a SWPPP. However, a number of projects do. Inspections are prioritized by performing inspections on those that need a SWPPP as the higher priority and those that do not need a SWPPP are a lower priority. Additionally, projects that have had a lot of problems, such as track out, or are near a receiving water, are put on the highest priority.

1. Inspection Findings

During this reporting period, PDSD inspected 15 construction sites. The findings were typical of construction sites and inspectors communicated what was needed in order to comply with AZPDES construction general permit.

2. Enforcement Actions

During this reporting period, PDSD issued 375 enforcement requests for corrective actions due to site deficiencies. These included the location, installation, and maintenance of controls, and the requirement for on-going inspections. 222 enforcement actions were resolved at the time of the follow-up inspection, and the remaining are in progress.

3. Transportation Projects

During this reporting period 280 inspections of Capital Improvement Projects (CIP) and Public Improvement Agreement (PIA) projects involving road construction were performed. SWPPP deficiency(s) were reported to the on-site superintendent, field engineer, or designated representative. Verbal warnings were given to correct the discovered deficiency(s) that ranged from track-out, sediment accumulation along the roadway, stormdrain inlet protection maintenance, improperly installed BMPs, stockpile management, concrete washout use, and record keeping. Follow-up inspections determined that all concerns were quickly addressed and resolved satisfactorily.

VII. Post-Construction Site Controls

A. REVIEW OF MASTER PLAN

The City of Tucson's Stormwater Master Plan was completed in 1996. A review of the Master Plan revealed that it is outdated. The Plan identified a number of upgrades needed in the infrastructure, including installing culverts along with identifying flood sensitive areas and developing flood hazard maps. Many of these have been completed or addressed. Additionally, it recommended utilizing water harvesting measures. This post construction measure is now a common practice! However, there are a number of other items, tasks or processes that are no longer performed, including the stormwater advisory committee, that no longer exists. This indicates a re-write of the plan is needed. At this time, the stormwater program is not funded and staff and funds are limited so an update of the plan is not a priority.

B. MUNICIPAL EMPLOYEE TRAINING

Municipal employee training for construction and post-construction is discussed under Section VI Construction Site Controls.

C. POST-CONSTRUCTION CONTROLS

In this report period, the City did not implement any new post-construction controls for municipal projects. The City will develop an inspection, maintenance, and tracking program for Post-Construction Controls.

1. Inspection of Privately owned Retention/Detention Basins

The Planning and Development Services Department (PDSD) has an on-going program for inspection of privately owned retention/detention basins to ensure that the basins continue to operate as designed. Every year PDSD inspects privately owned basins and performs follow up inspections if deficiencies are found.

2. Inspection of 75% of City Permitted Sites

In this report period, the City inspected all of the permitted sites. Planning and Development Services Department inspectors conducted post construction inspections of privately developed sites to ensure vegetative landscape cover was established to stabilize the site. The Stormwater Management Section conducted post-construction inspections for Capital Improvement Projects and Private Improvement Agreement projects that were completed during this report period. Permits and Codes Section performed post-construction inspections for AZPDES projects. No concerns or deficiencies were noted.

D. COMPLIANCE ACTIVITIES/ENFORCEMENT

1. Privately Owned Retention/Detention Basins Enforcement

No major enforcement actions (citations) were issued in this report period. However, 30 verbal or written requests for basin maintenance were given.

2. Summary of Follow-up Actions

Upon follow-up, all requested maintenance had been performed to keep basins functional.

PART 4: NUMERIC SUMMERY OF STORMWATER PROGRAM ACTIVITIES

I. Illicit Discharge Detection & Elimination Program

A. MUNICIPAL EMPLOYEE TRAINING

| STORMWATER MANAGEMENT PRACTICE OR ACTIVITY | 2011-12 | 2012-13 | 2013-14 | 2014-15 | 2015-16 |
|---|---------|---------|---------|---------|---------|
| Number of training sessions (on non-stormwater discharges and the IDDE program) | • 18 | • 85 | • | • | • |
| Number of employees attending training | • 128 | • 273 | • | • | • |

B. SPILL PREVENTION

| STORMWATER MANAGEMENT PRACTICE OR ACTIVITY | 2011-12 | 2012-13 | 2013-14 | 2014-15 | 2015-16 |
|--|---------|---------|---------|---------|---------|
| Number of municipal facilities identified with hazardous materials | • 9 | • 231 | • | • | • |
| Number of spills at municipal facilities with hazardous materials that occurred in outside areas | • 9 | • 12 | • | • | • |
| Number of facility assessments completed | • 213 | • 212 | • | • | • |
| Date of last review of site-specific materials handling and spill response procedures | • 6/12 | • 4/13 | • | • | • |

C. OUTFALL INSPECTION

| STORMWATER MANAGEMENT PRACTICE OR ACTIVITY | 2011-12 | 2012-13 | 2013-14 | 2014-15 | 2015-16 |
|---|---------|---------|---------|---------|---------|
| Total number of major outfalls identified to date | • 521 | • 521 | • | • | • |
| Total number inspected | • 113 | • 127 | • | • | • |
| Number of 'priority outfalls' identified to date | • 10 | • 13 | • | • | • |
| Number of 'priority outfalls' inspected | • 10 | • 13 | • | • | • |
| Number of potential dry weather flows detected | • 0 | • 0 | • | • | • |
| Number of potential dry weather flows investigated | • 0 | • 0 | • | • | • |
| Number of major outfalls sampled during dry weather flow | • 0 | • 0 | • | • | • |
| Number of illicit discharges identified | • 0 | • 0 | • | • | • |
| Number of illicit discharges eliminated | • 0 | • 0 | • | • | • |

D. MS4 INSPECTIONS

| STORMWATER MANAGEMENT PRACTICE OR ACTIVITY | 2011-12 | 2012-13 | 2013-14 | 2014-15 | 2015-16 |
|---|---------|---------|---------|---------|---------|
| Amount of Stormwater drainage system inspected (length) | • 29 | • 24 | • | • | • |
| Number of stormdrain cross connection investigations | • 3 | • 1 | • | • | • |
| Number of illicit connections detected | • 1 | • 1 | • | • | • |
| Number of illicit connections eliminated | • 1 | • 1 | • | • | • |
| Number of corrective or enforcement actions initiated within 60 days of identification | • 1 | • 7 | • | • | • |
| Percent of cases resolved or transferred to City Court System within 1 calendar year of original enforcement action | • 100% | • 100% | • | • | • |
| Illicit discharge from irrigation, misting, overflow and ponding | • 486 | • 501 | • | • | • |
| ○ Verbal warnings for above | • 275 | • 409 | • | • | • |
| ○ Written warnings for above | • 68 | • 30 | • | • | • |
| ○ Turned over to court for above | • 4 | • 7 | • | • | • |

E. INSPECTION DUE TO REPORTS OF DRY WEATHER FLOW

| STORMWATER MANAGEMENT PRACTICE OR ACTIVITY | 2011-12 | 2012-13 | 2013-14 | 2014-15 | 2015-16 |
|---|---------|---------|---------|---------|---------|
| Number of illicit discharge reports received | • 120 | • 123 | • | • | • |
| Percent of illicit discharge reports responded to | • 100% | • 100% | • | • | • |
| Percent of responses initiated within 3 business days | • 100% | • 100% | • | • | • |

II. Municipal Facility Stormwater Program**A. MUNICIPAL EMPLOYEE TRAINING**

| STORMWATER MANAGEMENT PRACTICE OR ACTIVITY | 2011-12 | 2012-13 | 2013-14 | 2014-15 | 2015-16 |
|---|---------|---------|---------|---------|---------|
| Number of training events (*Various) | • 54* | • 70* | • | • | • |
| Number of staff trained | • | • 4,196 | • | • | • |
| Number of Stormwater Staff Training Sessions/number trained | • 5/27 | • 0/0 | • | • | • |

B. MUNICIPAL FACILITY INVENTORY

| STORMWATER MANAGEMENT PRACTICE OR ACTIVITY | 2011-12 | 2012-13 | 2013-14 | 2014-15 | 2015-16 |
|---|----------|---------|---------|---------|---------|
| Total number of facilities on inventory | • 203 | • 203 | • | • | • |
| Date identification of “higher risk” facilities complete and date of prioritization of municipal facilities completed | • Nxt yr | • 10/12 | • | • | • |
| Number of municipally-owned high risk facilities identified | • Nxt yr | • 7 | • | • | • |

C. INSPECTIONS

| STORMWATER MANAGEMENT PRACTICE OR ACTIVITY | 2011-12 | 2012-13 | 2013-14 | 2014-15 | 2015-16 |
|---|---------|---------|---------|---------|---------|
| Miles of MS4 drainage system prioritized for inspection | • 426 | • 441 | • | • | • |
| Miles of priority drainage system visually inspected | • 250 | • 341 | • | • | • |
| Number of “higher risk” municipal facilities inspected | • 4 | • 10 | • | • | • |
| Number of “higher risk” municipal facilities found needing improved stormwater controls | • 0 | • 1 | • | • | • |

D. INFRASTRUCTURE MAINTENANCE

| STORMWATER MANAGEMENT PRACTICE OR ACTIVITY | 2011-12 | 2012-13 | 2013-14 | 2014-15 | 2015-16 |
|---|----------|----------|---------|---------|---------|
| Linear miles of drainage channel cleaned (city to maintain records documenting specific street cleaning events) | • 161 | • 99 | • | • | • |
| Linear miles of closed conduit cleaned | • 0.05 | • 0.3 | • | • | • |
| Street sweeping (linear miles) | • 24,709 | • 31,056 | • | • | • |
| Record amount of waste collected from street and lot sweeping (reported in pounds, gallons, etc.) | • 7,027 | • 8,856 | • | • | • |
| Number of retention/detention basins cleaned | • 10 | • 15 | • | • | • |
| Total number of catch basins identified to date | • 1,000 | • 1,000 | • | • | • |
| Number of catch basins cleaned | • 43 | • 26 | • | • | • |

III. Industrial Stormwater Program

A. MUNICIPAL EMPLOYEE TRAINING

| STORMWATER MANAGEMENT PRACTICE OR ACTIVITY | 2011-12 | 2012-13 | 2013-14 | 2014-15 | 2015-16 |
|---|---------|---------|---------|---------|---------|
| Number of training events for MS4 staff | • 5 | • 2 | • | • | • |
| Number of staff trained | • 3 | • 4 | • | • | • |

B. INVENTORY

| STORMWATER MANAGEMENT PRACTICE OR ACTIVITY | 2011-12 | 2012-13 | 2013-14 | 2014-15 | 2015-16 |
|---|---------|---------|---------|---------|---------|
| Number of Industrial facilities inspected | • 19 | • 44 | • | • | • |
| Total number of facilities on the priority list | • 33 | • 33 | • | • | • |

C. INSPECTIONS AND ENFORCEMENT ACTIONS

| STORMWATER MANAGEMENT PRACTICE OR ACTIVITY | 2011-12 | 2012-13 | 2013-14 | 2014-15 | 2015-16 |
|---|---------|---------|---------|---------|---------|
| Number of corrective or enforcement actions initiated on industrial facilities | • 7 | • 8 | • | • | • |
| Percent of cases resolved within one (1) calendar year of original enforcement action | • 100% | • 100% | • | • | • |
| Number of cases referred to the City Court System | • 0 | • 0 | • | • | • |

IV. Stormwater Construction Program Activities

A. MUNICIPAL EMPLOYEE TRAINING

| STORMWATER MANAGEMENT PRACTICE OR ACTIVITY | 2011-12 | 2012-13 | 2013-14 | 2014-15 | 2015-16 |
|---|---------|---------|---------|---------|---------|
| Number of training events for SWPPP plan review staff | • 1 | • 2 | • | • | • |
| Number of staff trained | • 3 | • 5 | • | • | • |

B. PLAN REVIEW

| STORMWATER MANAGEMENT PRACTICE OR ACTIVITY | 2011-12 | 2012-13 | 2013-14 | 2014-15 | 2015-16 |
|---|---------|---------|---------|---------|---------|
| Number of grading plans/SWPPPs submitted for review | • 47+ | • 121 | • | • | • |
| Number of ground disturbing permits issued that meet the AZPDES Construction General Permit eligibility | • 19+ | • 54 | • | • | • |
| Number of construction/grading plans reviewed for those that fall under AZPDES | • 24 | • 37 | • | • | • |
| Number of AZPDES permitted construction sites | • 24 | • 51 | • | • | • |

C. INSPECTIONS AND ENFORCEMENT ACTIONS

| STORMWATER MANAGEMENT PRACTICE OR ACTIVITY | 2011-12 | 2012-13 | 2013-14 | 2014-15 | 2015-16 |
|--|---------|---------|---------|---------|---------|
| Number of AZPDES construction sites inspected | • 24 | • 47 | • | • | • |
| Number of corrective or enforcement actions initiated on construction facilities | • 415 | • 566 | • | • | • |
| Number of corrective actions resolved | • 262 | • 361 | • | • | • |
| Number of corrective actions turned over to the City Court System | • 0 | • 0 | • | • | • |

V. Post Construction Program Activities

| STORMWATER MANAGEMENT PRACTICE OR ACTIVITY | 2011-12 | 2012-13 | 2013-14 | 2014-15 | 2015-16 |
|--|---------|---------|---------|---------|---------|
| Number of post-construction inspections completed | • 1,921 | • 2,318 | • | • | • |
| Number of corrective or enforcement actions initiated for post-construction activities | • 15 | • 30 | • | • | • |

PART 5 EVALUATION OF THE STORMWATER MANAGEMENT PROGRAM

The City's Stormwater Program goal is to improve stormwater quality through education and outreach. City staff extend a lot of effort on education to anyone who may impact stormwater quality. Outreach staff participate in multiple events, providing stormwater education material. Surveys performed by Pima Association of Governments and Pima County Department of Environmental Quality suggest that people are becoming more knowledgeable about stormwater. More time is spent on inspections, especially industrial, to ensure the operators understand the vulnerable areas with their sites and what they can do to prevent pollutants from leaving the site. Education is provided within schools and numerous outreach events described in Part 3 of this report. The effects of the outreach activities are hard to determine with the general public. However, it is evident that the extra time spent educating operators is effective, based on the findings during follow-up inspections. During this report period, the City has implemented a "Certificate of Excellence" provided to facilities that do an outstanding job managing their facility for stormwater quality. Four were issued this year; all to industrial facilities.

During this reporting period, the public outreach focus has been on the proper management and disposal of used oil, and how to clean up spills. The effectiveness of these topics is undetermined at this point.

The City believes these programs, that have been successfully implemented, are effective at reducing the pollutants in the stormwater. Based on observations and speediness to clean up spills the Stormwater Management Program is effective at reducing stormwater pollution.

PART 6 STORMWATER MANAGEMENT PROGRAM MODIFICATIONS

The Stormwater Management Plan has been in use for about a year. To date, only minor modifications have occurred that better describe what is needed in the stormwater program. The updated SWMP will be posted on the City's Internet site later this year.

Other possible changes are underway include:

- A five year public involvement/participation plan has been established and included in the SWMP,
 - Additional priority outfalls for IDDE Program have been identified and will be mapped,
 - City owned and operated facilities have been assessed,
 - Target groups for training and training topics are being developed.
1. Addition of New Control Measures: The City has prioritized industrial facility inspections based on each facility's potential for polluting the City's stormdrain system and the type of facility. For example, non-exposure facilities have the lowest priority for inspection.
 2. Addition of Temporary Control Measures: The City has added a few industrial/commercial facilities that do not fall under the requirements of an MSGP to the industrial inspection program because these facilities have had spills or discharges. These facilities are inspected annually until the inspector determines they are no longer a threat to polluting the City's MS4.
 3. Increase of Existing Control Measures: If a need arises to increase existing control measures and if human resources are available, the City will increase inspection frequency.
 4. Replacement of Existing Control Measures: In preparing the new Stormwater Management Plan, the City will evaluate control measures to determine if any existing measures should be replaced. To date, no changes are needed.

PART 7 MONITORING LOCATIONS

Stormwater is monitored at five locations within the City of Tucson. They are:

| Site | Land Use | Physical Location | Location | Watershed Area (acres) | Receiving Water |
|------|---------------------------|---------------------------------|---------------------------------------|------------------------|-----------------|
| 1 | Single Family Residential | Grant Road & Wilson Avenue | 32° 15' 02.83" N 110° 56' 15.23" W | 400 | SC |
| 2 | Multi-family Residential | Greenlee Road | 32° 16' 14.9" N 110° 53' 56.88" W | 49 | R, SC |
| 3 | Commercial | El Con Mall / Randolph Way | 32° 13' 16.16" N 110° 55' 04.77" W | 38 | SC |
| 4 | Industrial | 17 th Street | 32° 12' 48.33" N 110° 57' 12.33" W | 91 | SC |
| 5 | Mixed Use | First Avenue at Limberlost Road | 32° 16' 58.28" N 110° 57' 40.35" W | 380 | R, SC |

SC = Santa Cruz River, R = Rillito River, P = Pantano Wash

The flow from Sites 2 and 5 goes to the Rillito River and then to the Santa Cruz River. The other sites flow directly into the Santa Cruz River. At the discharge points, the Santa Cruz and Rillito are both normally dry, ephemeral washes with no aquatic habitat.

All five of the City's monitoring stations are equipped with automated sampling equipment. The automated equipment is programmed to collect flow-weighted samples at fixed time intervals. However, due to constant equipment malfunctions, sampling is conducted manually. Samples are composited at the laboratory based on storm hydrographs to achieve a flow-weighted composite for analysis.

ADEQ advised the City on May 9, 2013, to utilize automatic samplers. The City responded and obtained quotes and training on a variety of automatic samplers and how they worked. They learned that it is nearly impossible to collect flow proportional samples with automatic samplers and be in compliance with this permit at the same time. As convenient as it would be to have automatic samplers, the City decided against implementing automatic samplers in an effort to stay in compliance with the permit.

PART 8 STORM EVENT RECORDS

Rainfall (RF) in inches at each site (1,2,3,4,5) along with the status of the site and sampling.

| | Date | 1 | RF | 2 | RF | 3 | RF | 4 | RF | 5 | RF |
|---------------|-------|----|------|----|------|----|------|-------|------|----|------|
| Summer Season | 6/16 | | | | | | | | | EF | 0.3 |
| | 7/3 | | | NF | 0.14 | | | | | | |
| | 7/4 | | | 72 | 0.93 | | | | | | |
| | 7/10 | | | | | | | | | SC | 0.62 |
| | 7/15 | IN | 0.43 | SC | 1.21 | | | SC | 0.49 | | |
| | 7/20 | SC | 0.35 | | | SC | 0.36 | | | | |
| Winter Season | 11/9 | | | NF | 0.12 | | | | | | |
| | 12/13 | IN | 0.52 | IN | 0.68 | IN | 0.46 | EF/NF | 0.37 | IN | 0.41 |
| | 12/14 | | | | | 72 | 0.26 | 72 | 0.16 | | |
| | 12/15 | 72 | 0.1 | | | | | | | | |
| | 12/16 | 72 | 0.12 | | | 72 | 0.13 | | | | |
| | 12/19 | SC | 0.22 | | | 72 | 0.14 | EF/NF | 0.2 | IN | 0.13 |
| | 12/20 | | | NF | 0.15 | | | | | | |
| | 12/30 | | | IN | 0.35 | IN | 0.36 | IN | 0.25 | IN | 0.38 |
| | 12/31 | | | IN | 0.18 | | | | | | |
| | 1/ 26 | | | SC | 0.62 | IN | 0.58 | IN | 0.6 | SC | 0.67 |
| | 2/11 | | | | | IN | 0.16 | IN | 0.17 | | |
| | 2/20 | | | | | SC | 0.21 | SC | 0.46 | | |

12/30 and 12/31 Holiday

Key

NR Not Representative (storm event of less than 0.1 inches)
 SC Sample Collected
 IS Insufficient Sample (for analysis)
 NF No Flow

DC Dangerous Conditions
 72 Station closed for 72 hours
 IN Insufficient Staff
 EF Equipment Failure

PART 9 SUMMARY OF MONITORING DATA (BY LOCATION)

I. Sample Site 1

| | | | | | | | | | | | |
|--------------------------------|-------------------------|--|---------|----------|--------|---------|--------|---------|--------|---------|--------|
| Site ID: 1 Grant/Wilson | | Monitoring Season Summer: June 1 - October 31, Winter: November 1 - May 31 | | | | | | | | | |
| Receiving Water: Santa Cruz | | Winter | Summer | Winter | Summer | Winter | Summer | Winter | Summer | Winter | Summer |
| Land Use: SFR | | 2011-12 | 2012 | 2012-13 | 2013 | 2013-14 | 2014 | 2014-15 | 2015 | 2015-16 | 2016 |
| Sampling Date(s): | | 11/7/11 | 7/20/12 | 12/19/12 | | | | | | | |
| Monitoring Parameters | SWQS | | | | | | | | | | |
| Conventional Parameters | | | | | | | | | | | |
| Flow | n/a | 2.01 | 1.18 | 1.24 | | | | | | | |
| pH | 6.5 - 9 | 7.07 | 7.33 | 8.55 | | | | | | | |
| Temperature | n/a | 54 | 84 | 49 | | | | | | | |
| Hardness | <400 | 60 | 48 | 53 | | | | | | | |
| TDS (mg/L) | n/a | 120 | 180 | 110 | | | | | | | |
| TSS (mg/L) | n/a | 180 | 110 | 120 | | | | | | | |
| BOD (mg/L) | n/a | 25 | 74 | 110 | | | | | | | |
| COD (mg/L) | n/a | 230 | 250 | 110 | | | | | | | |
| Inorganics | | | | | | | | | | | |
| Cyanide, total (ug/L) | 84 | <100 | <100 | <5.0 | | | | | | | |
| Nutrients (mg/L) | | | | | | | | | | | |
| Nitrate + Nitrite as N | n/a | <0.0015 | 1.3 | <0.1 | | | | | | | |
| Ammonia as N | n/a | 0.63 | 1.8 | <0.5 | | | | | | | |
| Total Kjeldahl Nitrogen (TKN) | n/a | 3.4 | 4.9 | 1.9 | | | | | | | |
| Total Phosphorus | n/a | 0.43 | 0.38 | 0.6 | | | | | | | |
| Total Orthophosphate | n/a | <0.045 | 0.22 | <0.5 | | | | | | | |
| Microbiological (MPN) | | | | | | | | | | | |
| Escherichia coli (E. coli) | 575 | 2400 | 2000 | 2400 | | | | | | | |
| Total Metals (ug/L) | | | | | | | | | | | |
| Antimony | 747 | 3.1 | 1.9 | 0.82 | | | | | | | |
| Arsenic | 200 | <4.8 | 6.7 | <40 | | | | | | | |
| Barium | 98,000 | 130 | 92 | 66 | | | | | | | |
| Beryllium | 1,867 | <0.19 | <2.0 | <2.0 | | | | | | | |
| Cadmium | <3 ^{Note 1} | <0.31 | 0.29 | <2.0 | | | | | | | |
| Chromium | 1,000 | <0.61 | 5.1 | <30 | | | | | | | |
| Copper | <3 ^{Note 2} | 87 | 50 | 33 | | | | | | | |
| Lead | <17 ^{Note 3} | 21 | 8.6 | 14 | | | | | | | |
| Mercury | 5 | <0.014 | <1.0 | 0.09 | | | | | | | |
| Nickel | <882 ^{Note 5} | <1.1 | 9.6 | <50 | | | | | | | |
| Selenium | 33 | <0.062 | 0.68 | 0.35 | | | | | | | |
| Silver | <0.14 ^{Note 6} | <0.46 | 0.87 | 0.067 | | | | | | | |
| Thallium | 75 | <0.0036 | 0.048 | <0.063 | | | | | | | |
| Zinc | <235 ^{Note 7} | 230 | 140 | 100 | | | | | | | |

| | | | | | | | | | | | |
|---|------------------------|--|---------|----------|--------|---------|--------|---------|--------|---------|--------|
| Site ID: 1 Grant/Wilson | | Monitoring Season Summer: June 1 - October 31, Winter: November 1 - May 31 | | | | | | | | | |
| Receiving Water: Santa Cruz | | Winter | Summer | Winter | Summer | Winter | Summer | Winter | Summer | Winter | Summer |
| Land Use: SFR | | 2011-12 | 2012 | 2012-13 | 2013 | 2013-14 | 2014 | 2014-15 | 2015 | 2015-16 | 2016 |
| Sampling Date(s): | | 1/7/11 | 7/20/12 | 12/19/12 | | | | | | | |
| SWQS | | | | | | | | | | | |
| Organic Toxic Pollutants (mg/L) | | | | | | | | | | | |
| Total Petroleum Hydrocarbons | n/a | <5.00 | <5.00 | <5.00 | | | | | | | |
| Total Oil and Grease | n/a | 6.4 | <5.00 | <5.00 | | | | | | | |
| VOCs, Semi-VOCs, and Pesticides (ug/L) | | | | | | | | | | | |
| Acrolein | 467 | <10 | | <10 | | | | | | | |
| Acrylonitrile | 37,333 | <10 | | <10 | | | | | | | |
| Benzene | 3,733 | <2.0 | | <2.0 | | | | | | | |
| Bromoform | 18,667 | <2.0 | | <2.0 | | | | | | | |
| Carbon tetrachloride | 1,307 | <2.0 | | <2.0 | | | | | | | |
| Chlorobenzene | 18,667 | <2.0 | | <2.0 | | | | | | | |
| Chlorodibromomethane | n/a | <2.0 | | <2.0 | | | | | | | |
| Chloroethane | n/a | <5.0 | | <5.0 | | | | | | | |
| 2-chloroethylvinyl ether | n/a | <2.0 | | <10 | | | | | | | |
| Chloroform | 9,333 | <2.0 | | <2.0 | | | | | | | |
| Dichlorobromomethane | n/a | <2.0 | | <2.0 | | | | | | | |
| 1,2-dichlorobenzene | 5,900 | <2.0 | | <2.0 | | | | | | | |
| 1,3-dichlorobenzene | n/a | <2.0 | | <2.0 | | | | | | | |
| 1,4-dichlorobenzene | 6,500 | <2.0 | | <2.0 | | | | | | | |
| 1,1-dichloroethane | n/a | <2.0 | | <2.0 | | | | | | | |
| 1,2-dichloroethane | 186,667 | <2.0 | | <2.0 | | | | | | | |
| 1,1-dichloroethylene | 46,667 | <2.0 | | <2.0 | | | | | | | |
| 1,2-dichloropropane | 84,000 | <2.0 | | <2.0 | | | | | | | |
| 1,3-dichloropropylene | n/a | <2.0 | | <2.0 | | | | | | | |
| Ethylbenzene | 93,333 | <2.0 | | <2.0 | | | | | | | |
| Methyl bromide (Bromomethane) | n/a | <2.0 | | <2.0 | | | | | | | |
| Methyl chloride (Chloromethane) | n/a | <5.0 | | <5.0 | | | | | | | |
| Methylene chloride | n/a | <10 | | <10 | | | | | | | |
| 1,1,2,2-tetrachloroethane | 93,333 | <2.0 | | <2.0 | | | | | | | |
| Tetrachloroethylene | 9,333 | <2.0 | | <2.0 | | | | | | | |
| Toluene | 373,333 | <2.0 | | <2.0 | | | | | | | |
| 1,2-trans-dichloroethylene | n/a | <2.0 | | <2.0 | | | | | | | |
| 1,1,1-trichloroethane | 186,666,667 | <2.0 | | <2.0 | | | | | | | |
| 1,1,2-trichloroethane | 3,733 | <2.0 | | <2.0 | | | | | | | |
| Trichloroethylene | 280 | <2.0 | | <2.0 | | | | | | | |
| Trimethylbenzene | n/a | | | <2.0 | | | | | | | |
| Vinyl chloride (chloroethylene) | 2,800 | <2.0 | | <2.0 | | | | | | | |
| Xylene | 186,667 | <6.0 | | <6.0 | | | | | | | |

| | | | | | | | | | | | |
|---|-----------------------|--|---------|----------|--------|---------|--------|---------|--------|---------|--------|
| Site ID: 1 Grant/Wilson | | Monitoring Season Summer: June 1 - October 31, Winter: November 1 - May 31 | | | | | | | | | |
| Receiving Water: Santa Cruz | | Winter | Summer | Winter | Summer | Winter | Summer | Winter | Summer | Winter | Summer |
| Land Use: SFR | | 2011-12 | 2012 | 2012-13 | 2013 | 2013-14 | 2014 | 2014-15 | 2015 | 2015-16 | 2016 |
| Sampling Date(s): | | 11/7/11 | 7/20/12 | 12/19/12 | | | | | | | |
| SWQS | | | | | | | | | | | |
| SVOCs - Acid Extractables (ug/L) | | | | | | | | | | | |
| 2-chlorophenol | 4,667 | <9.8 | | <9.8 | | | | | | | |
| 2,4-dichlorophenol | 2,800 | <9.8 | | <9.8 | | | | | | | |
| 2,4-dimethylphenol | 18,667 | <9.8 | | <9.8 | | | | | | | |
| 4,6-dinitro-o-cresol (4,6-Dinitro-2 | 3,733 | <20 | | <20 | | | | | | | |
| 2,4-dinitrophenol | 1,867 | <49 | | <49 | | | | | | | |
| 2-nitrophenol | n/a | <9.8 | | <9.8 | | | | | | | |
| 4-nitrophenol | n/a | <49 | | <49 | | | | | | | |
| p-chloro-o-cresol (4-Chlor-3-met | n/a | <9.8 | | <9.8 | | | | | | | |
| Pentachlorophenol | <18 ^{Note 8} | <29 | | <29 | | | | | | | |
| Phenol | 180,000 | <9.8 | | <9.8 | | | | | | | |
| 2,4,6-trichlorophenol | 130 | <9.8 | | <9.8 | | | | | | | |
| SVOCs - Bases/Neutrals (ug/L) | | | | | | | | | | | |
| Acenaphthene | 56,000 | <4.9 | | <4.9 | | | | | | | |
| Acenaphthylene | n/a | <4.9 | | <4.9 | | | | | | | |
| Anthracene | 280,000 | <4.9 | | <4.9 | | | | | | | |
| Benzo(a)anthracene | 0.2 | <0.63 | | <0.6 | | | | | | | |
| Benzo(a)pyrene | 0.2 | <0.51 | | <4.9 | | | | | | | |
| Benzo(b)fluoranthene | n/a | <9.8 | | <1.6 | | | | | | | |
| Benzo(g,h,i)perylene | n/a | <4.9 | | <4.9 | | | | | | | |
| Benzo(k)fluoranthene | 1.9 | <1.3 | | <1.6 | | | | | | | |
| Chrysene | 19 | <4.9 | | <4.9 | | | | | | | |
| Dibenzo(a,h)anthracene | 1.9 | 0.48 | | <0.93 | | | | | | | |
| 3,3'-dichlorobenzidine | 3 | <1.1 | | <0.99 | | | | | | | |
| Diethyl phthalate | 746,667 | <9.8 | | <9.8 | | | | | | | |
| Dimethyl phthalate | n/a | <9.8 | | <9.8 | | | | | | | |
| Di-n-butyl phthalate | n/a | <9.8 | | <9.8 | | | | | | | |
| 2,4-dinitrotoluene | 1,867 | <9.8 | | <9.8 | | | | | | | |
| 2,6-dinitrotoluene | 3,733 | <9.8 | | <9.8 | | | | | | | |
| Din-octyl phthalate | 373,333 | <9.8 | | <9.8 | | | | | | | |
| 1,2-diphenylhydrazine (as azobenz | 1.8 | <9.8 | | <9.8 | | | | | | | |
| Fluoranthene | 37,333 | <4.9 | | <4.9 | | | | | | | |
| Fluorene | 37,333 | <4.9 | | <4.9 | | | | | | | |
| Hexachlorobenzene | 747 | <9.8 | | <9.8 | | | | | | | |
| Hexachlorobutadiene | 187 | <9.8 | | <9.8 | | | | | | | |
| Hexachlorocyclopentadiene | 11,200 | <9.8 | | <9.8 | | | | | | | |
| Hexachloroethane | 850 | <9.8 | | <9.8 | | | | | | | |
| Indeno(1,2,3-cd)pyrene | 1.9 | 0.91 | | <0.8 | | | | | | | |
| Isophorone | 186,667 | <9.8 | | <9.8 | | | | | | | |

| | | | | | | | | | | | |
|---|-------------------------|--|---------|----------|--------|---------|--------|---------|--------|---------|--------|
| Site ID: 1 Grant/Wilson | | Monitoring Season Summer: June 1 - October 31, Winter: November 1 - May 31 | | | | | | | | | |
| Receiving Water: Santa Cruz | | Winter | Summer | Winter | Summer | Winter | Summer | Winter | Summer | Winter | Summer |
| Land Use: SFR | | 2011-12 | 2012 | 2012-13 | 2013 | 2013-14 | 2014 | 2014-15 | 2015 | 2015-16 | 2016 |
| Sampling Date(s): | | 11/7/11 | 7/20/12 | 12/19/12 | | | | | | | |
| SWQS | | | | | | | | | | | |
| SVOCs - Bases/Neutrals (ug/L) continued | | | | | | | | | | | |
| Naphthalene | 18,667 | <4.9 | | <4.9 | | | | | | | |
| Nitrobenzene | 467 | <9.8 | | <9.8 | | | | | | | |
| Nnitrosodimethylamine | 0.03 | <0.18 | | <1.6 | | | | | | | |
| Nnitrosodi-n-propylamine | 88,667 | <9.8 | | <9.8 | | | | | | | |
| Nnitrosodiphenylamine | n/a | <9.8 | | <9.8 | | | | | | | |
| Phenanthrene | n/a | <4.9 | | <4.9 | | | | | | | |
| Pyrene | 28,000 | <4.9 | | <4.9 | | | | | | | |
| 1,2,4-trichlorobenzene | 9,333 | <9.8 | | <9.8 | | | | | | | |
| Pesticides (ug/L) | | | | | | | | | | | |
| Aldrin | <0.003 ^{Note9} | <0.097 | | <0.098 | | | | | | | |
| Alpha-BHC | n/a | <0.097 | | <0.098 | | | | | | | |
| Beta-BHC | n/a | <0.097 | | <0.098 | | | | | | | |
| Gamma-BHC | n/a | <0.097 | | <0.098 | | | | | | | |
| Delta-BHC | n/a | <0.097 | | <0.098 | | | | | | | |
| Chlordane (alpha, gamma) | 3.2 | <0.097 | | <0.0134 | | | | | | | |
| 4,4'-DDT | n/a | <0.097 | | <0.098 | | | | | | | |
| 4,4'-DDE | n/a | <0.097 | | <0.098 | | | | | | | |
| 4,4'-DDD | n/a | <0.097 | | <0.098 | | | | | | | |
| Dieldrin | <0.003 ^{Note9} | <0.097 | | <0.098 | | | | | | | |
| Alpha-endosulfan (Endosulfan I) | n/a | <0.097 | | <0.098 | | | | | | | |
| Beta-endosulfan (Endosulfan II) | n/a | <0.097 | | <0.098 | | | | | | | |
| Endosulfan sulfate | 3 | <0.097 | | <0.098 | | | | | | | |
| Endrin | 0.004 | <0.097 | | <0.098 | | | | | | | |
| Endrin aldehyde | 0.7 | <0.097 | | <0.098 | | | | | | | |
| Heptachlor | 0.9 | <0.097 | | <0.098 | | | | | | | |
| Heptachlor epoxide | 0.9 | <0.097 | | <0.098 | | | | | | | |
| PCB-1016 (Aroclor 1016) | n/a | <0.09 | | <0.97 | | | | | | | |
| PCB-1221 (Aroclor 1221) | n/a | <0.09 | | <0.97 | | | | | | | |
| PCB-1232 (Aroclor 1232) | n/a | <0.09 | | <0.97 | | | | | | | |
| PCB-1242 (Aroclor 1242) | n/a | <0.09 | | <0.97 | | | | | | | |
| PCB-1248 (Aroclor 1248) | n/a | <0.09 | | <0.97 | | | | | | | |
| PCB-1254 (Aroclor 1254) | n/a | <0.09 | | <0.97 | | | | | | | |
| PCB-1260 (Aroclor 1260) | n/a | <0.09 | | <0.97 | | | | | | | |
| Toxaphene | 0.005 | <0.97 | | <0.98 | | | | | | | |

II. Sample Site 2

| | | | | | | | | | | | |
|------------------------------------|-------------------------|--|---------|---------|--------|---------|--------|---------|--------|---------|--------|
| Site ID: 2 Greenlee | | Monitoring Season Summer: June 1 - October 31, Winter: November 1 - May 31 | | | | | | | | | |
| Receiving Water: Rillito Wash | | Winter | Summer | Winter | Summer | Winter | Summer | Winter | Summer | Winter | Summer |
| Land Use: Multi-Family Residential | | 2011-12 | 2012 | 2012-13 | 2013 | 2013-14 | 2014 | 2014-15 | 2015 | 2015-16 | 2016 |
| Sampling Date(s): | | 3/18/12 | 7/15/12 | 12/6/13 | | | | | | | |
| Monitoring Parameters | SWQS | | | | | | | | | | |
| Conventional Parameters | | | | | | | | | | | |
| Flow | n/a | 0.1 | 3.32 | 1.02 | | | | | | | |
| pH | 6.5 - 9 | 7.97 | 8.61 | 6.3 | | | | | | | |
| Temperature | n/a | 49 | 79 | 62 | | | | | | | |
| Hardness | <400 | 30 | 27 | 16 | | | | | | | |
| TDS (mg/L) | n/a | 160 | 79 | 43 | | | | | | | |
| TSS (mg/L) | n/a | 15 | 70 | 24 | | | | | | | |
| BOD (mg/L) | n/a | 37 | 16 | 20 | | | | | | | |
| COD (mg/L) | n/a | 160 | 89 | 64 | | | | | | | |
| Inorganics | | | | | | | | | | | |
| Cyanide, total (ug/L) | 84 | <100 | <100 | <100 | | | | | | | |
| Nutrients (mg/L) | | | | | | | | | | | |
| Nitrate + Nitrite as N | n/a | <0.1 | <0.1 | <0.10 | | | | | | | |
| Ammonia as N | n/a | 0.87 | <0.5 | 0.56 | | | | | | | |
| Total Kjeldahl Nitrogen (TKN) | n/a | 2.5 | 2.2 | 1.2 | | | | | | | |
| Total Phosphorus | n/a | 0.32 | 0.36 | 0.35 | | | | | | | |
| Total Orthophosphate | n/a | <0.50 | 0.19 | <0.50 | | | | | | | |
| Microbiological (MPN) | | | | | | | | | | | |
| Escherichia coli (E. coli) | 575 | 87 | 2400 | 770 | | | | | | | |
| Total Metals (ug/L) | | | | | | | | | | | |
| Antimony | 747 | <0.50 | 0.34 | 0.25 | | | | | | | |
| Arsenic | 200 | <40 | <40 | <40 | | | | | | | |
| Barium | 98,000 | <50 | 49 | <50 | | | | | | | |
| Beryllium | 1,867 | <2.0 | <2 | <2.0 | | | | | | | |
| Cadmium | <3 ^{Note 1} | <2.0 | 0.4 | <2.0 | | | | | | | |
| Chromium | 1,000 | <30 | 1.8 | <30 | | | | | | | |
| Copper | <3 ^{Note 2} | <20 | 19 | <20 | | | | | | | |
| Lead | <17 ^{Note 3} | 0.96 | 2.7 | 1.4 | | | | | | | |
| Mercury | 5 | <1.0 | <1 | <1.0 | | | | | | | |
| Nickel | <882 ^{Note 5} | <50 | 3 | <50 | | | | | | | |
| Selenium | 33 | <2.5 | 0.26 | <2.5 | | | | | | | |
| Silver | <0.14 ^{Note 6} | <10 | 0.99 | 0.014 | | | | | | | |
| Thallium | 75 | <0.50 | 0.022 | <0.5 | | | | | | | |
| Zinc | <235 ^{Note 7} | 56 | 78 | <40 | | | | | | | |

| | | | | | | | | | | | |
|---|-------------|--|---------|---------|--------|---------|--------|---------|--------|---------|--------|
| Site ID: 2 Greenlee | | Monitoring Season Summer: June 1 - October 31, Winter: November 1 - May 31 | | | | | | | | | |
| Receiving Water: Rillito Wash | | Winter | Summer | Winter | Summer | Winter | Summer | Winter | Summer | Winter | Summer |
| Land Use: Multi-Family Residential | | 2011-12 | 2012 | 2012-13 | 2013 | 2013-14 | 2014 | 2014-15 | 2015 | 2015-16 | 2016 |
| Sampling Date(s): | | 3/18/12 | 7/15/12 | 1/26/13 | | | | | | | |
| SWQS | | | | | | | | | | | |
| Organic Toxic Pollutants (mg/L) | | | | | | | | | | | |
| Total Petroleum Hydrocarbons | n/a | <5.00 | <5.00 | <5.00 | | | | | | | |
| Total Oil and Grease | n/a | <5.00 | <5.00 | <5.00 | | | | | | | |
| VOCs, Semi-VOCs, and Pesticides (ug/L) | | | | | | | | | | | |
| Acrolein | 467 | <10 | | <10 | | | | | | | |
| Acrylonitrile | 37,333 | <10 | | <10 | | | | | | | |
| Benzene | 3,733 | <2.0 | | <2.0 | | | | | | | |
| Bromoform | 18,667 | <2.0 | | <2.0 | | | | | | | |
| Carbon tetrachloride | 1,307 | <2.0 | | <2.0 | | | | | | | |
| Chlorobenzene | 18,667 | <2.0 | | <2.0 | | | | | | | |
| Chlorodibromomethane | n/a | <2.0 | | <2.0 | | | | | | | |
| Chloroethane | n/a | <5.0 | | <5.0 | | | | | | | |
| 2-chloroethylvinyl ether | n/a | <2.0 | | <10 | | | | | | | |
| Chloroform | 9,333 | <2.0 | | <2.0 | | | | | | | |
| Dichlorobromomethane | n/a | <2.0 | | <2.0 | | | | | | | |
| 1,2-dichlorobenzene | 5,900 | <2.0 | | <2.0 | | | | | | | |
| 1,3-dichlorobenzene | n/a | <2.0 | | <2.0 | | | | | | | |
| 1,4-dichlorobenzene | 6,500 | <2.0 | | <2.0 | | | | | | | |
| 1,1-dichloroethane | n/a | <2.0 | | <2.0 | | | | | | | |
| 1,2-dichloroethane | 186,667 | <2.0 | | <2.0 | | | | | | | |
| 1,1-dichloroethylene | 46,667 | <2.0 | | <2.0 | | | | | | | |
| 1,2-dichloropropane | 84,000 | <2.0 | | <2.0 | | | | | | | |
| 1,3-dichloropropylene | n/a | <2.0 | | <2.0 | | | | | | | |
| Ethylbenzene | 93,333 | <2.0 | | <2.0 | | | | | | | |
| Methyl bromide (Bromomethane) | n/a | <2.0 | | <2.0 | | | | | | | |
| Methyl chloride (Chloromethane) | n/a | <5.0 | | <5.0 | | | | | | | |
| Methylene chloride | n/a | <10 | | <10 | | | | | | | |
| 1,1,2,2-tetrachloroethane | 93,333 | <2.0 | | <2.0 | | | | | | | |
| Tetrachloroethylene | 9,333 | <2.0 | | <2.0 | | | | | | | |
| Toluene | 373,333 | <2.0 | | <2.0 | | | | | | | |
| 1,2-trans-dichloroethylene | n/a | <2.0 | | <2.0 | | | | | | | |
| 1,1,1-trichloroethane | 186,666,667 | <2.0 | | <2.0 | | | | | | | |
| 1,1,2-trichloroethane | 3,733 | <2.0 | | <2.0 | | | | | | | |
| Trichloroethylene | 280 | <2.0 | | <2.0 | | | | | | | |
| Trimethylbenzene | n/a | | | <2.0 | | | | | | | |
| Vinyl chloride (chloroethylene) | 2,800 | <2.0 | | <2.0 | | | | | | | |
| Xylene | 186,667 | <6.0 | | <6.0 | | | | | | | |

| | | | | | | | | | | | |
|---|-----------------------|--|---------|---------|--------|---------|--------|---------|--------|---------|--------|
| Site ID: 2 Greenlee | | Monitoring Season Summer: June 1 - October 31, Winter: November 1 - May 31 | | | | | | | | | |
| Receiving Water: Rillito Wash | | Winter | Summer | Winter | Summer | Winter | Summer | Winter | Summer | Winter | Summer |
| Land Use: Multi-Family Residential | | 2011-12 | 2012 | 2012-13 | 2013 | 2013-14 | 2014 | 2014-15 | 2015 | 2015-16 | 2016 |
| Sampling Date(s): | | 3/18/12 | 7/15/12 | 1/26/13 | | | | | | | |
| SWQS | | | | | | | | | | | |
| SVOCs - Acid Extractables (ug/L) | | | | | | | | | | | |
| 2-chlorophenol | 4,667 | <9.8 | | <9.9 | | | | | | | |
| 2,4-dichlorophenol | 2,800 | <9.8 | | <9.9 | | | | | | | |
| 2,4-dimethylphenol | 18,667 | <9.8 | | <9.9 | | | | | | | |
| 4,6-dinitro-o-cresol (4,6-Dinitro-2 | 3,733 | <20 | | <20 | | | | | | | |
| 2,4-dinitrophenol | 1,867 | <49 | | <50 | | | | | | | |
| 2-nitrophenol | n/a | <9.8 | | <9.9 | | | | | | | |
| 4-nitrophenol | n/a | <49 | | <50 | | | | | | | |
| p-chloro-o-cresol (4-Chlor-3-met | n/a | <9.8 | | <9.9 | | | | | | | |
| Pentachlorophenol | <18 ^{Note 8} | <29 | | <30 | | | | | | | |
| Phenol | 180,000 | <9.8 | | <9.9 | | | | | | | |
| 2,4,6-trichlorophenol | 130 | <9.8 | | <9.9 | | | | | | | |
| SVOCs - Bases/Neutrals (ug/L) | | | | | | | | | | | |
| Acenaphthene | 56,000 | <4.9 | | <5.0 | | | | | | | |
| Acenaphthylene | n/a | <4.9 | | <5.0 | | | | | | | |
| Anthracene | 280,000 | <4.9 | | <5.0 | | | | | | | |
| Benzo(a)anthracene | 0.2 | <0.63 | | <5.0 | | | | | | | |
| Benzo(a)pyrene | 0.2 | <0.51 | | <0.75 | | | | | | | |
| Benzo(b)fluoranthene | n/a | <9.8 | | <1.6 | | | | | | | |
| Benzo(g,h,i)perylene | n/a | <4.9 | | <5.0 | | | | | | | |
| Benzo(k)fluoranthene | 1.9 | <1.3 | | <1.6 | | | | | | | |
| Chrysene | 19 | <4.9 | | <5.0 | | | | | | | |
| Dibenzo(a,h)anthracene | 1.9 | 0.48 | | <0.94 | | | | | | | |
| 3,3'-dichlorobenzidine | 3 | <1.1 | | <1.0 | | | | | | | |
| Diethyl phthalate | 746,667 | <9.8 | | <9.9 | | | | | | | |
| Dimethyl phthalate | n/a | <9.8 | | <9.9 | | | | | | | |
| Di-n-butyl phthalate | n/a | <9.8 | | <9.9 | | | | | | | |
| 2,4-dinitrotoluene | 1,867 | <9.8 | | <9.9 | | | | | | | |
| 2,6-dinitrotoluene | 3,733 | <9.8 | | <9.9 | | | | | | | |
| Di-n-octyl phthalate | 373,333 | <9.8 | | <9.9 | | | | | | | |
| 1,2-diphenylhydrazine (as azobenz | 1.8 | <9.8 | | <9.9 | | | | | | | |
| Fluoranthene | 37,333 | <4.9 | | <5.0 | | | | | | | |
| Fluorene | 37,333 | <4.9 | | <5.0 | | | | | | | |
| Hexachlorobenzene | 747 | <9.8 | | <9.9 | | | | | | | |
| Hexachlorobutadiene | 187 | <9.8 | | <9.9 | | | | | | | |
| Hexachlorocyclopentadiene | 11,200 | <9.8 | | <9.9 | | | | | | | |
| Hexachloroethane | 850 | <9.8 | | <9.9 | | | | | | | |
| Indeno(1,2,3-cd)pyrene | 1.9 | 0.91 | | <0.81 | | | | | | | |
| Isophorone | 186,667 | <9.8 | | <9.9 | | | | | | | |

| | | | | | | | | | | | |
|---|-------------------------|--|---------|---------|--------|---------|--------|---------|--------|---------|--------|
| Site ID: 2 Greenlee | | Monitoring Season Summer: June 1 - October 31, Winter: November 1 - May 31 | | | | | | | | | |
| Receiving Water: Rillito Wash | | Winter | Summer | Winter | Summer | Winter | Summer | Winter | Summer | Winter | Summer |
| Land Use: Multi-Family Residential | | 2011-12 | 2012 | 2012-13 | 2013 | 2013-14 | 2014 | 2014-15 | 2015 | 2015-16 | 2016 |
| Sampling Date(s): | | 3/18/12 | 7/15/12 | 1/26/13 | | | | | | | |
| SWQS | | | | | | | | | | | |
| SVOCs - Bases/Neutrals (ug/L) continued | | | | | | | | | | | |
| Naphthalene | 18,667 | <4.9 | | <5.0 | | | | | | | |
| Nitrobenzene | 467 | <9.8 | | <9.9 | | | | | | | |
| Nnitrosodimethylamine | 0.03 | <0.18 | | <1.6 | | | | | | | |
| Nnitrosodi-n-propylamine | 88,667 | <9.8 | | <9.9 | | | | | | | |
| Nnitrosodiphenylamine | n/a | <9.8 | | <9.9 | | | | | | | |
| Phenanthrene | n/a | <4.9 | | <5.0 | | | | | | | |
| Pyrene | 28,000 | <4.9 | | <5.0 | | | | | | | |
| 1,2,4-trichlorobenzene | 9,333 | <9.8 | | <9.9 | | | | | | | |
| Pesticides (ug/L) | | | | | | | | | | | |
| Aldrin | <0.003 ^{Note9} | <0.097 | | <0.099 | | | | | | | |
| Alpha-BHC | n/a | <0.097 | | <0.099 | | | | | | | |
| Beta-BHC | n/a | <0.097 | | <0.099 | | | | | | | |
| Gamma-BHC | n/a | <0.097 | | <0.099 | | | | | | | |
| Delta-BHC | n/a | <0.097 | | <0.099 | | | | | | | |
| Chlordane (alpha, gamma) | 3.2 | <0.097 | | <0.099 | | | | | | | |
| 4,4'-DDT | n/a | <0.097 | | <0.099 | | | | | | | |
| 4,4'-DDE | n/a | <0.097 | | <0.099 | | | | | | | |
| 4,4'-DDD | n/a | <0.097 | | <0.099 | | | | | | | |
| Dieldrin | <0.003 ^{Note9} | <0.097 | | <0.099 | | | | | | | |
| Alpha-endosulfan (Endosulfan I) | n/a | <0.097 | | <0.099 | | | | | | | |
| Beta-endosulfan (Endosulfan II) | n/a | <0.097 | | <0.099 | | | | | | | |
| Endosulfan sulfate | 3 | <0.097 | | <0.099 | | | | | | | |
| Endrin | 0.004 | <0.097 | | <0.099 | | | | | | | |
| Endrin aldehyde | 0.7 | <0.097 | | <0.099 | | | | | | | |
| Heptachlor | 0.9 | <0.097 | | <0.099 | | | | | | | |
| Heptachlor epoxide | 0.9 | <0.097 | | <0.099 | | | | | | | |
| PCB1016 (Aroclor 1016) | n/a | <0.09 | | <1.0 | | | | | | | |
| PCB1221 (Aroclor 1221) | n/a | <0.09 | | <1.0 | | | | | | | |
| PCB1232 (Aroclor 1232) | n/a | <0.09 | | <1.0 | | | | | | | |
| PCB1242 (Aroclor 1242) | n/a | <0.09 | | <1.0 | | | | | | | |
| PCB1248 (Aroclor 1248) | n/a | <0.09 | | <1.0 | | | | | | | |
| PCB1254 (Aroclor 1254) | n/a | <0.09 | | <1.0 | | | | | | | |
| PCB1260 (Aroclor 1260) | n/a | <0.09 | | <1.0 | | | | | | | |
| Toxaphene | 0.005 | <0.99 | | <0.99 | | | | | | | |

III. Sample Site 3

| | | | | | | | | | | | | |
|--------------------------------|-------------------------|--|---------|---------|--------|---------|--------|---------|--------|---------|--------|--|
| Site ID: 3 Randolph/Broadway | | Monitoring Season Summer: June 1 - October 31, Winter: November 1 - May 31 | | | | | | | | | | |
| Receiving Water: Santa Cruz | | Winter | Summer | Winter | Summer | Winter | Summer | Winter | Summer | Winter | Summer | |
| Land Use: Commercial | | 2011-12 | 2012 | 2012-13 | 2013 | 2013-14 | 2014 | 2014-15 | 2015 | 2015-16 | 2016 | |
| Sampling Date(s): | | 12/12/11 | 7/20/12 | 2/20/13 | | | | | | | | |
| Monitoring Parameters | SWQS | | | | | | | | | | | |
| Conventional Parameters | | | | | | | | | | | | |
| Flow | n/a | 1.59 | 2.25 | 1.25 | | | | | | | | |
| pH | 6.5 - 9 | 6.74 | 8.39 | 7.5 | | | | | | | | |
| Temperature | n/a | 54 | 88 | 44 | | | | | | | | |
| Hardness | <400 | 23 | 28 | 25 | | | | | | | | |
| TDS (mg/L) | n/a | 33 | 92 | 63 | | | | | | | | |
| TSS (mg/L) | n/a | 86 | 57 | 59 | | | | | | | | |
| BOD (mg/L) | n/a | 20 | 100 | 15 | | | | | | | | |
| COD (mg/L) | n/a | 140 | 110 | 130 | | | | | | | | |
| Inorganics | | | | | | | | | | | | |
| Cyanide, total (ug/L) | 84 | <100 | <100 | <100 | | | | | | | | |
| Nutrients (mg/L) | | | | | | | | | | | | |
| Nitrate + Nitrite as N | n/a | <0.0015 | <0.10 | <0.1 | | | | | | | | |
| Ammonia as N | n/a | <1.0 | 1.3 | 0.63 | | | | | | | | |
| Total Kjeldahl Nitrogen (TKN) | n/a | 0.58 | 2.3 | 1.3 | | | | | | | | |
| Total Phosphorus | n/a | 0.19 | 0.25 | 0.16 | | | | | | | | |
| Total Orthophosphate | n/a | <0.045 | 0.13 | <0.50 | | | | | | | | |
| Microbiological (MPN) | | | | | | | | | | | | |
| Escherichia coli (E. coli) | 575 | 770 | 370 | 580 | 130 | | | | | | | |
| Total Metals (ug/L) | | | | | | | | | | | | |
| Antimony | 747 | 3.3 | 3.5 | 2 | | | | | | | | |
| Arsenic | 200 | <4.8 | <40 | <40 | | | | | | | | |
| Barium | 98,000 | 60 | 50 | 57 | | | | | | | | |
| Beryllium | 1,867 | <0.19 | <2.0 | <2.0 | | | | | | | | |
| Cadmium | <3 ^{Note 1} | <0.31 | 0.44 | <2.0 | | | | | | | | |
| Chromium | 1,000 | <0.61 | 3.6 | <30 | | | | | | | | |
| Copper | <3 ^{Note 2} | 61 | 34 | 44 | | | | | | | | |
| Lead | <17 ^{Note 3} | 19 | 7.9 | 12 | | | | | | | | |
| Mercury | 5 | <0.014 | <1.0 | <0.032 | | | | | | | | |
| Nickel | <882 ^{Note 5} | <1.1 | 4.8 | <50 | | | | | | | | |
| Selenium | 33 | <0.062 | <2.5 | 1.7 | | | | | | | | |
| Silver | <0.14 ^{Note 6} | <0.46 | 0.95 | 0.0054 | | | | | | | | |
| Thallium | 75 | <0.0036 | 0.018 | 0.018 | | | | | | | | |
| Zinc | <235 ^{Note 7} | 240 | 150 | 190 | | | | | | | | |

| Site ID: 3 Randolph/Broadway | | Monitoring Season Summer: June 1 - October 31, Winter: November 1 - May 31 | | | | | | | | | |
|--|-------------|--|---------|---------|--------|---------|--------|---------|--------|---------|--------|
| Receiving Water: Santa Cruz | | Winter | Summer | Winter | Summer | Winter | Summer | Winter | Summer | Winter | Summer |
| Land Use: Commercial | | 2011-12 | 2012 | 2012-13 | 2013 | 2013-14 | 2014 | 2014-15 | 2015 | 2015-16 | 2016 |
| Sampling Date(s): | | 12/12/11 | 7/20/12 | 2/20/13 | | | | | | | |
| SWQS | | | | | | | | | | | |
| Organic Toxic Pollutants (mg/L) | | | | | | | | | | | |
| Total Petroleum Hydrocarbons | n/a | 8 | <5 | <5.00 | | | | | | | |
| Total Oil and Grease | n/a | 7.4 | <5 | 5.9 | | | | | | | |
| VOCs, Semi-VOCs, and Pesticides (ug/L) | | | | | | | | | | | |
| Acrolein | 467 | <0 | | <10 | | | | | | | |
| Acrylonitrile | 37,333 | <0.92 | | <10 | | | | | | | |
| Benzene | 3,733 | <0.25 | | <2.0 | | | | | | | |
| Bromoform | 18,667 | <0.33 | | <2.0 | | | | | | | |
| Carbon tetrachloride | 1,307 | <0.18 | | <2.0 | | | | | | | |
| Chlorobenzene | 18,667 | <0.24 | | <2.0 | | | | | | | |
| Chlorodibromomethane | n/a | <0.20 | | <2.0 | | | | | | | |
| Chloroethane | n/a | <0.17 | | <5.0 | | | | | | | |
| 2-chloroethylvinyl ether | n/a | <0.31 | | <10 | | | | | | | |
| Chloroform | 9,333 | <0.19 | | <2.0 | | | | | | | |
| Dichlorobromomethane | n/a | <0.21 | | <2.0 | | | | | | | |
| 1,2-dichlorobenzene | 5,900 | <0.48 | | <2.0 | | | | | | | |
| 1,3-dichlorobenzene | n/a | <0.35 | | <2.0 | | | | | | | |
| 1,4-dichlorobenzene | 6,500 | <0.41 | | <2.0 | | | | | | | |
| 1,1-dichloroethane | n/a | <0.17 | | <2.0 | | | | | | | |
| 1,2-dichloroethane | 186,667 | <0.21 | | <2.0 | | | | | | | |
| 1,1-dichloroethylene | 46,667 | <0.28 | | <2.0 | | | | | | | |
| 1,2-dichloropropane | 84,000 | <0.0 | | <2.0 | | | | | | | |
| 1,3-dichloropropylene | n/a | <0.30 | | <2.0 | | | | | | | |
| Ethylbenzene | 93,333 | <0.24 | | <2.0 | | | | | | | |
| Methyl bromide (Bromomethane) | n/a | <0.21 | | <2.0 | | | | | | | |
| Methyl chloride (Chloromethane) | n/a | <0.28 | | <5.0 | | | | | | | |
| Methylene chloride | n/a | <0.28 | | <10 | | | | | | | |
| 1,1,2,2-tetrachloroethane | 93,333 | <0.50 | | <2.0 | | | | | | | |
| Tetrachloroethylene | 9,333 | <0.29 | | <2.0 | | | | | | | |
| Toluene | 373,333 | <0.22 | | <2.0 | | | | | | | |
| 1,2-trans-dichloroethylene | n/a | <0.23 | | <2.0 | | | | | | | |
| 1,1,1-trichloroethane | 186,666,667 | <0.23 | | <2.0 | | | | | | | |
| 1,1,2-trichloroethane | 3,733 | <0.32 | | <2.0 | | | | | | | |
| Trichloroethylene | 280 | <0.19 | | <2.0 | | | | | | | |
| Trimethylbenzene | n/a | | | <2.0 | | | | | | | |
| Vinyl chloride (chloroethylene) | 2,800 | <0.32 | | <2.0 | | | | | | | |
| Xylene | 186,667 | <0.63 | | <6.0 | | | | | | | |

| | | | | | | | | | | | |
|---|----------------------|--|---------|---------|--------|---------|--------|---------|--------|---------|--------|
| Site ID: 3 Randolph/Broadway | | Monitoring Season Summer: June 1 - October 31, Winter: November 1 - May 31 | | | | | | | | | |
| Receiving Water: Santa Cruz | | Winter | Summer | Winter | Summer | Winter | Summer | Winter | Summer | Winter | Summer |
| Land Use: Commercial | | 2011-12 | 2012 | 2012-13 | 2013 | 2013-14 | 2014 | 2014-15 | 2015 | 2015-16 | 2016 |
| Sampling Date(s): | | 12/12/11 | 7/20/12 | 2/20/13 | | | | | | | |
| SWQS | | | | | | | | | | | |
| SVOCs - Acid Extractables (ug/L) | | | | | | | | | | | |
| 2-chlorophenol | 4,667 | <9.2 | | <20 | | | | | | | |
| 2,4-dichlorophenol | 2,800 | <7.9 | | <20 | | | | | | | |
| 2,4-dimethylphenol | 18,667 | <2.4 | | <20 | | | | | | | |
| 4,6-dinitro-o-cresol (4,6-Dinitro-2 | 3,733 | <12 | | <41 | | | | | | | |
| 2,4-dinitrophenol | 1,867 | <14 | | <100 | | | | | | | |
| 2-nitrophenol | n/a | <7.3 | | <20 | | | | | | | |
| 4-nitrophenol | n/a | <5.1 | | <100 | | | | | | | |
| p-chloro-o-cresol (4-Chlor-3-meth | n/a | <4.1 | | <20 | | | | | | | |
| Pentachlorophenol | <18 ^{Notes} | <9.2 | | <3 | | | | | | | |
| Phenol | 180,000 | <19 | | <20 | | | | | | | |
| 2,4,6-trichlorophenol | 130 | <8.4 | | <20 | | | | | | | |
| SVOCs - Bases/Neutrals (ug/L) | | | | | | | | | | | |
| Acenaphthene | 56,000 | <5.1 | | <10 | | | | | | | |
| Acenaphthylene | n/a | <5.0 | | <10 | | | | | | | |
| Anthracene | 280,000 | <5.3 | | <10 | | | | | | | |
| Benzo(a)anthracene | 0.2 | <6.3 | | <1.2 | | | | | | | |
| Benzo(a)pyrene | 0.2 | <5.0 | | <1.5 | | | | | | | |
| Benzo(b)fluoranthene | n/a | <13 | | <3.3 | | | | | | | |
| Benzo(g,h,i)perylene | n/a | <7.4 | | <10 | | | | | | | |
| Benzo(k)fluoranthene | 1.9 | <13 | | <3.3 | | | | | | | |
| Chrysene | 19 | <2.5 | | <10 | | | | | | | |
| Dibenzo(a,h)anthracene | 1.9 | <3.7 | | <1.9 | | | | | | | |
| 3,3'-dichlorobenzidine | 3 | <11 | | <2 | | | | | | | |
| Diethyl phthalate | 746,667 | <2.3 | | <20 | | | | | | | |
| Dimethyl phthalate | n/a | <3.2 | | <20 | | | | | | | |
| Di-n-butyl phthalate | n/a | <18 | | <20 | | | | | | | |
| 2,4-dinitrotoluene | 1,867 | <2.1 | | <20 | | | | | | | |
| 2,6-dinitrotoluene | 3,733 | <1.8 | | <20 | | | | | | | |
| Di-n-octyl phthalate | 373,333 | <4.5 | | <20 | | | | | | | |
| 1,2-diphenylhydrazine (as azobenz | 1.8 | <9.7 | | <5.1 | | | | | | | |
| Fluoranthene | 37,333 | <5.9 | | <10 | | | | | | | |
| Fluorene | 37,333 | <5.8 | | <10 | | | | | | | |
| Hexachlorobenzene | 747 | <7.6 | | <20 | | | | | | | |
| Hexachlorobutadiene | 187 | <2.1 | | <20 | | | | | | | |
| Hexachlorocyclopentadiene | 11,200 | <9.7 | | <20 | | | | | | | |
| Hexachloroethane | 850 | <2.2 | | <20 | | | | | | | |
| Indeno(1,2,3-cd)pyrene | 1.9 | <6.9 | | <1.7 | | | | | | | |
| Isophorone | 186,667 | <1.8 | | <20 | | | | | | | |

| Site ID: 3 Randolph/Broadway | | Monitoring Season Summer: June 1 - October 31, Winter: November 1 - May 31 | | | | | | | | | |
|--|-------------------------|--|---------|---------|--------|---------|--------|---------|--------|---------|--------|
| Receiving Water: Santa Cruz | | Winter | Summer | Winter | Summer | Winter | Summer | Winter | Summer | Winter | Summer |
| Land Use: Commercial | | 2011-12 | 2012 | 2012-13 | 2013 | 2013-14 | 2014 | 2014-15 | 2015 | 2015-16 | 2016 |
| Sampling Date(s): | | 12/12/11 | 7/20/12 | 2/20/13 | | | | | | | |
| SWQS | | | | | | | | | | | |
| SVOCs - Bases/Neutrals (ug/L) continued | | | | | | | | | | | |
| Naphthalene | 18,667 | <5.6 | | <10 | | | | | | | |
| Nitrobenzene | 467 | <3.0 | | <20 | | | | | | | |
| N-nitrosodimethylamine | 0.03 | <1.7 | | <3.3 | | | | | | | |
| N-nitrosodipropylamine | 88,667 | <2.4 | | <20 | | | | | | | |
| N-nitrosodiphenylamine | n/a | <7.2 | | <20 | | | | | | | |
| Phenanthrene | n/a | <4.8 | | <10 | | | | | | | |
| Pyrene | 28,000 | <5.8 | | <10 | | | | | | | |
| 1,2,4-trichlorobenzene | 9,333 | <1.7 | | <20 | | | | | | | |
| Pesticides (ug/L) | | | | | | | | | | | |
| Aldrin | <0.003 ^{Note9} | <0.0098 | | <0.10 | | | | | | | |
| Alpha-BHC | n/a | <0.020 | | <0.10 | | | | | | | |
| Beta-BHC | n/a | <0.020 | | <0.10 | | | | | | | |
| Gamma-BHC | n/a | <0.0098 | | <0.10 | | | | | | | |
| Delta-BHC | n/a | <0.020 | | <0.10 | | | | | | | |
| Chlordane (alpha, gamma) | 3.2 | <0.0076 | | <0.10 | | | | | | | |
| 4,4'-DDT | n/a | <0.0029 | | <0.10 | | | | | | | |
| 4,4'-DDE | n/a | <0.0069 | | <0.10 | | | | | | | |
| 4,4'-DDD | n/a | <0.0098 | | <0.10 | | | | | | | |
| Dieldrin | <0.003 ^{Note9} | <0.0049 | | <0.10 | | | | | | | |
| Alpha-endosulfan (Endosulfan I) | n/a | <0.0098 | | <0.10 | | | | | | | |
| Beta-endosulfan (Endosulfan II) | n/a | <0.029 | | <0.10 | | | | | | | |
| Endosulfan sulfate | 3 | <0.088 | | <0.10 | | | | | | | |
| Endrin | 0.004 | <0.0059 | | <0.10 | | | | | | | |
| Endrin aldehyde | 0.7 | <0.0049 | | <0.10 | | | | | | | |
| Heptachlor | 0.9 | <0.020 | | <0.10 | | | | | | | |
| Heptachlor epoxide | 0.9 | <0.020 | | <0.10 | | | | | | | |
| PCB1016 (Aroclor 1016) | n/a | <0.089 | | <0.98 | | | | | | | |
| PCB1221 (Aroclor 1221) | n/a | <0.97 | | <0.98 | | | | | | | |
| PCB1232 (Aroclor 1232) | n/a | <0.97 | | <0.98 | | | | | | | |
| PCB1242 (Aroclor 1242) | n/a | <0.97 | | <0.98 | | | | | | | |
| PCB1248 (Aroclor 1248) | n/a | <0.97 | | <0.98 | | | | | | | |
| PCB1254 (Aroclor 1254) | n/a | <0.97 | | <0.98 | | | | | | | |
| PCB1260 (Aroclor 1260) | n/a | <0.060 | | <0.98 | | | | | | | |
| Toxaphene | 0.005 | <0.98 | | <0.10 | | | | | | | |

IV. Sample Site 4

| | | | | | | | | | | | |
|-------------------------------|-------------------------|--|---------|---------|--------|---------|--------|---------|--------|---------|--------|
| Site ID: 4 17th Street | | Monitoring Season Summer: June 1 - October 31, Winter: November 1 - May 31 | | | | | | | | | |
| Receiving Water: Santa Cruz | | Winter | Summer | Winter | Summer | Winter | Summer | Winter | Summer | Winter | Summer |
| Land Use: Industrial | | 2011-12 | 2012 | 2012-13 | 2013 | 2013-14 | 2014 | 2014-15 | 2015 | 2015-16 | 2016 |
| Sampling Date(s): | | 11/13/11 | 7/15/12 | 2/20/13 | | | | | | | |
| Monitoring Parameters | SWQS | | | | | | | | | | |
| Conventional Parameters | | | | | | | | | | | |
| Flow | n/a | 3.82 | 1.89 | 0.9 | | | | | | | |
| pH | 6.5 - 9 | 7.95 | 7.78 | 7.7 | | | | | | | |
| Temperature | n/a | 60 | 75 | 44 | | | | | | | |
| Hardness | <400 | 60 | 76 | 180 | | | | | | | |
| TDS (mg/L) | n/a | 98 | 44 | 130 | | | | | | | |
| TSS (mg/L) | n/a | 170 | 200 | 590 | | | | | | | |
| BOD (mg/L) | n/a | 10 | 14 | 26 | | | | | | | |
| COD (mg/L) | n/a | 96 | 140 | 370 | | | | | | | |
| Inorganics | | | | | | | | | | | |
| Cyanide, total (ug/L) | 84 | <100 | <100 | <100 | | | | | | | |
| Nutrients (mg/L) | | | | | | | | | | | |
| Nitrate + Nitrite as N | n/a | <0.0015 | <0.10 | <0.10 | | | | | | | |
| Ammonia as N | n/a | <0.068 | 0.74 | 0.99 | | | | | | | |
| Total Kjeldahl Nitrogen (TKN) | n/a | 1.5 | 1.7 | 2.4 | | | | | | | |
| Total Phosphorus | n/a | 0.33 | 0.39 | 0.5 | | | | | | | |
| Total Orthophosphate | n/a | <0.045 | 0.12 | <0.5 | | | | | | | |
| Microbiological (MPN) | | | | | | | | | | | |
| Escherichia coli (E. coli) | 575 | 2400 | 2400 | 54 | | | | | | | |
| Total Metals (ug/L) | | | | | | | | | | | |
| Antimony | 747 | 1.2 | 1.2 | 2.5 | | | | | | | |
| Arsenic | 200 | <4.8 | 6.1 | <40 | | | | | | | |
| Barium | 98,000 | 72 | 100 | 270 | | | | | | | |
| Beryllium | 1,867 | <0.19 | <2.0 | <2.0 | | | | | | | |
| Cadmium | <3 ^{Note 1} | <0.31 | 0.5 | <2.0 | | | | | | | |
| Chromium | 1,000 | <0.61 | 5.5 | <30 | | | | | | | |
| Copper | <3 ^{Note 2} | 52 | 67 | 160 | | | | | | | |
| Lead | <17 ^{Note 3} | 16 | 19 | 42 | | | | | | | |
| Mercury | 5 | <0.014 | <1.0 | <0.032 | | | | | | | |
| Nickel | <882 ^{Note 5} | <1.1 | 6 | <50 | | | | | | | |
| Selenium | 33 | <0.062 | 0.32 | 1.9 | | | | | | | |
| Silver | <0.14 ^{Note 6} | <0.46 | 0.85 | 0.24 | | | | | | | |
| Thallium | 75 | <0.0036 | 0.063 | 0.1 | | | | | | | |
| Zinc | <235 ^{Note 7} | 190 | 220 | 440 | | | | | | | |

| | | | | | | | | | | | |
|---|-------------|--|---------|---------|--------|---------|--------|---------|--------|---------|--------|
| Site ID: 4 17th Street | | Monitoring Season Summer: June 1 - October 31, Winter: November 1 - May 31 | | | | | | | | | |
| Receiving Water: Santa Cruz | | Winter | Summer | Winter | Summer | Winter | Summer | Winter | Summer | Winter | Summer |
| Land Use: Industrial | | 2011-12 | 2012 | 2012-13 | 2013 | 2013-14 | 2014 | 2014-15 | 2015 | 2015-16 | 2016 |
| Sampling Date(s): | | 11/13/11 | 7/15/12 | 2/20/13 | | | | | | | |
| SWQS | | | | | | | | | | | |
| Organic Toxic Pollutants (mg/L) | | | | | | | | | | | |
| Total Petroleum Hydrocarbons | n/a | <5.00 | <5.00 | <5.00 | | | | | | | |
| Total Oil and Grease | n/a | <0.570 | 11.5 | 8.5 | | | | | | | |
| VOCs, Semi-VOCs, and Pesticides (ug/L) | | | | | | | | | | | |
| Acrolein | 467 | <10 | | <10 | | | | | | | |
| Acrylonitrile | 37,333 | <0.92 | | <10 | | | | | | | |
| Benzene | 3,733 | <0.25 | | <2.0 | | | | | | | |
| Bromoform | 18,667 | <0.33 | | <2.0 | | | | | | | |
| Carbon tetrachloride | 1,307 | <0.18 | | <2.0 | | | | | | | |
| Chlorobenzene | 18,667 | <0.24 | | <2.0 | | | | | | | |
| Chlorodibromomethane | n/a | <0.21 | | <2.0 | | | | | | | |
| Chloroethane | n/a | <0.17 | | <5.0 | | | | | | | |
| 2-chloroethylvinyl ether | n/a | <0.31 | | <10 | | | | | | | |
| Chloroform | 9,333 | <0.19 | | <2.0 | | | | | | | |
| Dichlorobromomethane | n/a | <0.20 | | <2.0 | | | | | | | |
| 1,2-dichlorobenzene | 5,900 | <0.48 | | <2.0 | | | | | | | |
| 1,3-dichlorobenzene | n/a | <0.35 | | <2.0 | | | | | | | |
| 1,4-dichlorobenzene | 6,500 | <0.41 | | <2.0 | | | | | | | |
| 1,1-dichloroethane | n/a | <0.17 | | <2.0 | | | | | | | |
| 1,2-dichloroethane | 186,667 | <0.21 | | <2.0 | | | | | | | |
| 1,1-dichloroethylene | 46,667 | <0.28 | | <2.0 | | | | | | | |
| 1,2-dichloropropane | 84,000 | <2.0 | | <2.0 | | | | | | | |
| 1,3-dichloropropylene | n/a | <0.17 | | <2.0 | | | | | | | |
| Ethylbenzene | 93,333 | <0.24 | | <2.0 | | | | | | | |
| Methyl bromide (Bromomethane) | n/a | <0.21 | | <2.0 | | | | | | | |
| Methyl chloride (Chloromethane) | n/a | <0.28 | | <5.0 | | | | | | | |
| Methylene chloride | n/a | <0.28 | | <10 | | | | | | | |
| 1,1,2,2-tetrachloroethane | 93,333 | <0.50 | | <2.0 | | | | | | | |
| Tetrachloroethylene | 9,333 | <0.29 | | <2.0 | | | | | | | |
| Toluene | 373,333 | <0.22 | | <2.0 | | | | | | | |
| 1,2-trans-dichloroethylene | n/a | <0.23 | | <2.0 | | | | | | | |
| 1,1,1-trichloroethane | 186,666,667 | <0.23 | | <2.0 | | | | | | | |
| 1,1,2-trichloroethane | 3,733 | <0.32 | | <2.0 | | | | | | | |
| Trichloroethylene | 280 | <0.19 | | <2.0 | | | | | | | |
| Trimethylbenzene | n/a | | | <2.0 | | | | | | | |
| Vinyl chloride (chloroethylene) | 2,800 | <0.32 | | <2.0 | | | | | | | |
| Xylene | 186,667 | <0.63 | | <6.0 | | | | | | | |

| | | | | | | | | | | | |
|---|-----------------------|--|---------|---------|--------|---------|--------|---------|--------|---------|--------|
| Site ID: 4 17th Street | | Monitoring Season Summer: June 1 - October 31, Winter: November 1 - May 31 | | | | | | | | | |
| Receiving Water: Santa Cruz | | Winter | Summer | Winter | Summer | Winter | Summer | Winter | Summer | Winter | Summer |
| Land Use: Industrial | | 2011-12 | 2012 | 2012-13 | 2013 | 2013-14 | 2014 | 2014-15 | 2015 | 2015-16 | 2016 |
| Sampling Date(s): | | 11/13/11 | 7/15/12 | 2/20/13 | | | | | | | |
| | SWQS | | | | | | | | | | |
| SVOCs - Acid Extractables (ug/L) | | | | | | | | | | | |
| 2-chlorophenol | 4,667 | <9.2 | | <20 | | | | | | | |
| 2,4-dichlorophenol | 2,800 | <7.9 | | <20 | | | | | | | |
| 2,4-dimethylphenol | 18,667 | <2.4 | | <20 | | | | | | | |
| 4,6-dinitro-o-cresol (4,6-Dinitro-2 | 3,733 | <12 | | <39 | | | | | | | |
| 2,4-dinitrophenol | 1,867 | <14 | | <98 | | | | | | | |
| 2-nitrophenol | n/a | <7.3 | | <20 | | | | | | | |
| 4-nitrophenol | n/a | <5.1 | | <98 | | | | | | | |
| p-chloro-o-cresol (4-Chlor-3-met | n/a | <4.1 | | <20 | | | | | | | |
| Pentachlorophenol | <18 ^{Note 8} | <9.2 | | <2.9 | | | | | | | |
| Phenol | 180,000 | <19 | | <20 | | | | | | | |
| 2,4,6-trichlorophenol | 130 | <8.4 | | <20 | | | | | | | |
| SVOCs - Bases/Neutrals (ug/L) | | | | | | | | | | | |
| Acenaphthene | 56,000 | <5.1 | | <9.8 | | | | | | | |
| Acenaphthylene | n/a | <5.0 | | <9.8 | | | | | | | |
| Anthracene | 280,000 | <5.3 | | <9.8 | | | | | | | |
| Benzo(a)anthracene | 0.2 | <6.3 | | <1.2 | | | | | | | |
| Benzo(a)pyrene | 0.2 | <5.0 | | <1.5 | | | | | | | |
| Benzo(b)fluoranthene | n/a | <13 | | <3.2 | | | | | | | |
| Benzo(g,h,i)perylene | n/a | <7.4 | | <9.8 | | | | | | | |
| Benzo(k)fluoranthene | 1.9 | <13 | | <3.2 | | | | | | | |
| Chrysene | 19 | <2.5 | | <9.8 | | | | | | | |
| Dibenzo(a,h)anthracene | 1.9 | <3.7 | | <1.9 | | | | | | | |
| 3,3'-dichlorobenzidine | 3 | <11 | | <2.0 | | | | | | | |
| Diethyl phthalate | 746,667 | <2.3 | | <20 | | | | | | | |
| Dimethyl phthalate | n/a | <3.2 | | <20 | | | | | | | |
| Din-butyl phthalate | n/a | <18 | | <20 | | | | | | | |
| 2,4-dinitrotoluene | 1,867 | <2.1 | | <20 | | | | | | | |
| 2,6-dinitrotoluene | 3,733 | <1.8 | | <20 | | | | | | | |
| Din-octyl phthalate | 373,333 | <4.5 | | <20 | | | | | | | |
| 1,2-diphenylhydrazine (as azobenz | 1.8 | <97 | | <4.9 | | | | | | | |
| Fluoranthene | 37,333 | <5.9 | | <9.8 | | | | | | | |
| Fluorene | 37,333 | <5.8 | | <9.8 | | | | | | | |
| Hexachlorobenzene | 747 | <7.6 | | <20 | | | | | | | |
| Hexachlorobutadiene | 187 | <2.1 | | <20 | | | | | | | |
| Hexachlorocyclopentadiene | 11,200 | <9.7 | | <20 | | | | | | | |
| Hexachloroethane | 850 | <2.2 | | <20 | | | | | | | |
| Indeno(1,2,3-cd)pyrene | 1.9 | <6.9 | | <1.6 | | | | | | | |
| Isophorone | 186,667 | <1.8 | | <20 | | | | | | | |

| | | | | | | | | | | | |
|---|-------------------------|--|---------|---------|--------|---------|--------|---------|--------|---------|--------|
| Site ID: 4 17th Street | | Monitoring Season Summer: June 1 - October 31, Winter: November 1 - May 31 | | | | | | | | | |
| Receiving Water: Santa Cruz | | Winter | Summer | Winter | Summer | Winter | Summer | Winter | Summer | Winter | Summer |
| Land Use: Industrial | | 2011-12 | 2012 | 2012-13 | 2013 | 2013-14 | 2014 | 2014-15 | 2015 | 2015-16 | 2016 |
| Sampling Date(s): | | 11/13/11 | 7/15/12 | 2/20/13 | | | | | | | |
| SWQS | | | | | | | | | | | |
| SVOCs - Bases/Neutrals (ug/L) continued | | | | | | | | | | | |
| Naphthalene | 18,667 | <5.6 | | <9.8 | | | | | | | |
| Nitrobenzene | 467 | <3.0 | | <20 | | | | | | | |
| Nnitrosodimethylamine | 0.03 | <1.7 | | <3.2 | | | | | | | |
| Nnitrosodi-n-propylamine | 88,667 | <2.4 | | <20 | | | | | | | |
| Nnitrosodiphenylamine | n/a | <7.2 | | <20 | | | | | | | |
| Phenanthrene | n/a | <4.8 | | <9.8 | | | | | | | |
| Pyrene | 28,000 | <5.8 | | <9.8 | | | | | | | |
| 1,2,4-trichlorobenzene | 9,333 | <1.7 | | <20 | | | | | | | |
| Pesticides (ug/L) | | | | | | | | | | | |
| Aldrin | <0.003 ^{Note9} | <0.0098 | | <0.099 | | | | | | | |
| Alpha-BHC | n/a | <0.020 | | <0.099 | | | | | | | |
| Beta-BHC | n/a | <0.020 | | <0.099 | | | | | | | |
| Gamma-BHC | n/a | <0.0098 | | <0.099 | | | | | | | |
| Delta-BHC | n/a | <0.020 | | <0.099 | | | | | | | |
| Chlordane (alpha, gamma) | 3.2 | <0.0076 | | <0.099 | | | | | | | |
| 4,4'-DDT | n/a | <0.0029 | | <0.099 | | | | | | | |
| 4,4'-DDE | n/a | <0.0068 | | <0.099 | | | | | | | |
| 4,4'-DDD | n/a | <0.0097 | | <0.099 | | | | | | | |
| Dieldrin | <0.003 ^{Note9} | <0.0049 | | <0.099 | | | | | | | |
| Alpha-endosulfan (Endosulfan I) | n/a | <0.0098 | | <0.099 | | | | | | | |
| Beta-endosulfan (Endosulfan II) | n/a | <0.029 | | <0.099 | | | | | | | |
| Endosulfan sulfate | 3 | <0.088 | | <0.099 | | | | | | | |
| Endrin | 0.004 | <0.0059 | | <0.099 | | | | | | | |
| Endrin aldehyde | 0.7 | <0.0049 | | <0.099 | | | | | | | |
| Heptachlor | 0.9 | <0.020 | | <0.099 | | | | | | | |
| Heptachlor epoxide | 0.9 | <0.020 | | <0.099 | | | | | | | |
| PCB1016 (Aroclor 1016) | n/a | <0.090 | | <1.0 | | | | | | | |
| PCB1221 (Aroclor 1221) | n/a | <0.98 | | <1.0 | | | | | | | |
| PCB1232 (Aroclor 1232) | n/a | <0.98 | | <1.0 | | | | | | | |
| PCB1242 (Aroclor 1242) | n/a | <0.98 | | <1.0 | | | | | | | |
| PCB1248 (Aroclor 1248) | n/a | <0.98 | | <1.0 | | | | | | | |
| PCB1254 (Aroclor 1254) | n/a | <0.98 | | <1.0 | | | | | | | |
| PCB1260 (Aroclor 1260) | n/a | <0.060 | | <1.0 | | | | | | | |
| Toxaphene | 0.005 | <0.98 | | <0.99 | | | | | | | |

V. Sample Site 5

| | | | | | | | | | | | |
|--------------------------------|-------------------------|--|---------|---------|--------|---------|--------|---------|--------|---------|--------|
| Site ID: 5 Limberlost/1st | | Monitoring Season Summer: June 1 - October 31, Winter: November 1 - May 31 | | | | | | | | | |
| Receiving Water: Rillito Wash | | Winter | Summer | Winter | Summer | Winter | Summer | Winter | Summer | Winter | Summer |
| Land Use: Mixed | | 2011-12 | 2012 | 2012-13 | 2013 | 2013-14 | 2014 | 2014-15 | 2015 | 2015-16 | 2016 |
| Sampling Date(s): | | 2/14/12 | 7/10/12 | 12/6/13 | | | | | | | |
| Monitoring Parameters | SWQS | | | | | | | | | | |
| Conventional Parameters | | | | | | | | | | | |
| Flow | n/a | 1.07 | 10.19 | 6.52 | | | | | | | |
| pH | 6.5 - 9 | 7.75 | 8.25 | 6.5 | | | | | | | |
| Temperature | n/a | 53 | 85 | 66 | | | | | | | |
| Hardness | <400 | 100 | 92 | 28 | | | | | | | |
| TDS (mg/L) | n/a | 300 | 120 | 49 | | | | | | | |
| TSS (mg/L) | n/a | 170 | 500 | 160 | | | | | | | |
| BCD (mg/L) | n/a | 100 | 27 | 17 | | | | | | | |
| COD (mg/L) | n/a | 470 | 260 | 130 | | | | | | | |
| Inorganics | | | | | | | | | | | |
| Cyanide, total (ug/L) | 84 | <100 | <100 | <100 | | | | | | | |
| Nutrients (mg/L) | | | | | | | | | | | |
| Nitrate + Nitrite as N | n/a | 2 | 1.1 | <0.10 | | | | | | | |
| Ammonia as N | n/a | 3.7 | 1.1 | <0.50 | | | | | | | |
| Total Kjeldahl Nitrogen (TKN) | n/a | 8.8 | 19 | 0.97 | | | | | | | |
| Total Phosphorus | n/a | 0.69 | 0.9 | 0.55 | | | | | | | |
| Total Orthophosphate | n/a | 0.5 | 0.16 | <0.5 | | | | | | | |
| Microbiological (MPN) | | | | | | | | | | | |
| Escherichia coli (E. coli) | 575 | 93 | 2400 | 2400 | | | | | | | |
| Total Metals (ug/L) | | | | | | | | | | | |
| Antimony | 747 | <0.2 | 2.2 | 0.99 | | | | | | | |
| Arsenic | 200 | <40 | 7.3 | <40 | | | | | | | |
| Barium | 98,000 | 130 | 180 | <50 | | | | | | | |
| Beryllium | 1,867 | <2.0 | <2.0 | <2.0 | | | | | | | |
| Cadmium | <3 ^{Note 1} | <2.0 | <2.0 | <2.0 | | | | | | | |
| Chromium | 1,000 | <30 | 12 | <30 | | | | | | | |
| Copper | <3 ^{Note 2} | 99 | 97 | 22 | | | | | | | |
| Lead | <17 ^{Note 3} | <0.04 | 40 | 12 | | | | | | | |
| Mercury | 5 | <1.0 | <1.0 | 0.04 | | | | | | | |
| Nickel | <882 ^{Note 5} | <50 | 13 | <50 | | | | | | | |
| Selenium | 33 | <0.04 | 0.36 | 0.36 | | | | | | | |
| Silver | <0.14 ^{Note 6} | <10 | <10 | 0.013 | | | | | | | |
| Thallium | 75 | <0.05 | 0.04 | <0.5 | | | | | | | |
| Zinc | <235 ^{Note 7} | 720 | 420 | 210 | | | | | | | |

| | | | | | | | | | | | |
|---|-------------|--|---------|---------|--------|---------|--------|---------|--------|---------|--------|
| Site ID: 5 Limberlost/1st | | Monitoring Season Summer: June 1 - October 31, Winter: November 1 - May 31 | | | | | | | | | |
| Receiving Water: Rillito Wash | | Winter | Summer | Winter | Summer | Winter | Summer | Winter | Summer | Winter | Summer |
| Land Use: Mixed | | 2011-12 | 2012 | 2012-13 | 2013 | 2013-14 | 2014 | 2014-15 | 2015 | 2015-16 | 2016 |
| Sampling Date(s): | | 2/14/12 | 7/10/12 | 1/26/13 | | | | | | | |
| SWQS | | | | | | | | | | | |
| Organic Toxic Pollutants (mg/L) | | | | | | | | | | | |
| Total Petroleum Hydrocarbons | n/a | 8.9 | <5.00 | <5.00 | | | | | | | |
| Total Oil and Grease | n/a | 10.6 | 13 | 6.2 | | | | | | | |
| VOCs, Semi-VOCs, and Pesticides (ug/L) | | | | | | | | | | | |
| Acrolein | 467 | <50 | | <50 | | | | | | | |
| Acrylonitrile | 37,333 | <50 | | <50 | | | | | | | |
| Benzene | 3,733 | <10 | | <10 | | | | | | | |
| Bromoform | 18,667 | <10 | | <10 | | | | | | | |
| Carbon tetrachloride | 1,307 | <10 | | <10 | | | | | | | |
| Chlorobenzene | 18,667 | <10 | | <10 | | | | | | | |
| Chlorodibromomethane | n/a | <10 | | <10 | | | | | | | |
| Chloroethane | n/a | <25 | | <25 | | | | | | | |
| 2-chloroethylvinyl ether | n/a | <50 | | <50 | | | | | | | |
| Chloroform | 9,333 | <10 | | <10 | | | | | | | |
| Dichlorobromomethane | n/a | <10 | | <10 | | | | | | | |
| 1,2-dichlorobenzene | 5,900 | <10 | | <10 | | | | | | | |
| 1,3-dichlorobenzene | n/a | <10 | | <10 | | | | | | | |
| 1,4-dichlorobenzene | 6,500 | <10 | | <10 | | | | | | | |
| 1,1-dichloroethane | n/a | <10 | | <10 | | | | | | | |
| 1,2-dichloroethane | 186,667 | <10 | | <10 | | | | | | | |
| 1,1-dichloroethylene | 46,667 | <10 | | <10 | | | | | | | |
| 1,2-dichloropropane | 84,000 | <10 | | <10 | | | | | | | |
| 1,3-dichloropropylene | n/a | <10 | | <10 | | | | | | | |
| Ethylbenzene | 93,333 | <10 | | <10 | | | | | | | |
| Methyl bromide (Bromomethane) | n/a | <10 | | <10 | | | | | | | |
| Methyl chloride (Chloromethane) | n/a | <25 | | <25 | | | | | | | |
| Methylene chloride | n/a | <50 | | <50 | | | | | | | |
| 1,1,2,2-tetrachloroethane | 93,333 | <10 | | <10 | | | | | | | |
| Tetrachloroethylene | 9,333 | <10 | | <10 | | | | | | | |
| Toluene | 373,333 | <10 | | <10 | | | | | | | |
| 1,2-trans-dichloroethylene | n/a | <10 | | <10 | | | | | | | |
| 1,1,1-trichloroethane | 186,666,667 | <10 | | <10 | | | | | | | |
| 1,1,2-trichloroethane | 3,733 | <10 | | <10 | | | | | | | |
| Trichloroethylene | 280 | <10 | | <10 | | | | | | | |
| Trimethylbenzene | n/a | | | <10 | | | | | | | |
| Vinyl chloride (chloroethylene) | 2,800 | <10 | | <10 | | | | | | | |
| Xylene | 186,667 | <30 | | <30 | | | | | | | |

| | | | | | | | | | | | |
|---|-----------------------|--|---------|---------|--------|---------|--------|---------|--------|---------|--------|
| Site ID: 5 Limberlost/1st | | Monitoring Season Summer: June 1 - October 31, Winter: November 1 - May 31 | | | | | | | | | |
| Receiving Water: Rillito Wash | | Winter | Summer | Winter | Summer | Winter | Summer | Winter | Summer | Winter | Summer |
| Land Use: Mixed | | 2011-12 | 2012 | 2012-13 | 2013 | 2013-14 | 2014 | 2014-15 | 2015 | 2015-16 | 2016 |
| Sampling Date(s): | | 2/14/12 | 7/10/12 | 12/6/13 | | | | | | | |
| SWQS | | | | | | | | | | | |
| SVOCs - Acid Extractables (ug/L) | | | | | | | | | | | |
| 2-chlorophenol | 4,667 | <9.9 | | <10 | | | | | | | |
| 2,4-dichlorophenol | 2,800 | <9.9 | | <10 | | | | | | | |
| 2,4-dimethylphenol | 18,667 | <9.9 | | <10 | | | | | | | |
| 4,6-dinitro-o-cresol (4,6-Dinitro-2 | 3,733 | <9.9 | | <20 | | | | | | | |
| 2,4-dinitrophenol | 1,867 | <49 | | <50 | | | | | | | |
| 2-nitrophenol | n/a | <9.9 | | <10 | | | | | | | |
| 4-nitrophenol | n/a | <49 | | <50 | | | | | | | |
| p-chloro-o-cresol (4-Chlor-3-meth | n/a | <9.9 | | <10 | | | | | | | |
| Pentachlorophenol | <18 ^{Note 8} | <30 | | <30 | | | | | | | |
| Phenol | 180,000 | <9.9 | | <10 | | | | | | | |
| 2,4,6-trichlorophenol | 130 | <9.9 | | <10 | | | | | | | |
| SVOCs - Bases/Neutrals (ug/L) | | | | | | | | | | | |
| Acenaphthene | 56,000 | <4.9 | | <5.0 | | | | | | | |
| Acenaphthylene | n/a | <4.9 | | <5.0 | | | | | | | |
| Anthracene | 280,000 | <4.9 | | <5.0 | | | | | | | |
| Benzo(a)anthracene | 0.2 | <0.64 | | <0.61 | | | | | | | |
| Benzo(a)pyrene | 0.2 | <4.9 | | <0.76 | | | | | | | |
| Benzo(b)fluoranthene | n/a | <1.3 | | <1.6 | | | | | | | |
| Benzo(g,h,i)perylene | n/a | <4.9 | | <5.0 | | | | | | | |
| Benzo(k)fluoranthene | 1.9 | <1.3 | | <1.6 | | | | | | | |
| Chrysene | 19 | <4.9 | | <5.0 | | | | | | | |
| Dibenzo(a,h)anthracene | 1.9 | <0.37 | | <0.95 | | | | | | | |
| 3,3'-dichlorobenzidine | 3 | <1.1 | | <1.0 | | | | | | | |
| Diethyl phthalate | 746,667 | <9.9 | | <10 | | | | | | | |
| Dimethyl phthalate | n/a | <9.9 | | <10 | | | | | | | |
| Din-butyl phthalate | n/a | <9.9 | | <10 | | | | | | | |
| 2,4-dinitrotoluene | 1,867 | <9.9 | | <10 | | | | | | | |
| 2,6-dinitrotoluene | 3,733 | <9.9 | | <10 | | | | | | | |
| Din-octyl phthalate | 373,333 | <9.9 | | <10 | | | | | | | |
| 1,2-diphenylhydrazine (as azobenz | 1.8 | <9.9 | | <10 | | | | | | | |
| Fluoranthene | 37,333 | <4.9 | | <5.0 | | | | | | | |
| Fluorene | 37,333 | <4.9 | | <5.0 | | | | | | | |
| Hexachlorobenzene | 747 | <9.9 | | <10 | | | | | | | |
| Hexachlorobutadiene | 187 | <9.9 | | <10 | | | | | | | |
| Hexachlorocyclopentadiene | 11,200 | <9.9 | | <10 | | | | | | | |
| Hexachloroethane | 850 | <9.9 | | <10 | | | | | | | |
| Indeno(1,2,3-cd)pyrene | 1.9 | <0.7 | | <0.82 | | | | | | | |
| Isophorone | 186,667 | <9.9 | | <10 | | | | | | | |

| | | | | | | | | | | | |
|---|-------------------------|--|---------|---------|--------|---------|--------|---------|--------|---------|--------|
| Site ID: 5 Limberlost/1st | | Monitoring Season Summer: June 1 - October 31, Winter: November 1 - May 31 | | | | | | | | | |
| Receiving Water: Rillito Wash | | Winter | Summer | Winter | Summer | Winter | Summer | Winter | Summer | Winter | Summer |
| Land Use: Mixed | | 2011-12 | 2012 | 2012-13 | 2013 | 2013-14 | 2014 | 2014-15 | 2015 | 2015-16 | 2016 |
| Sampling Date(s): | | 2/14/12 | 7/10/12 | 1/26/13 | | | | | | | |
| SWQS | | | | | | | | | | | |
| SVOCs - Bases/Neutrals (ug/L) continued | | | | | | | | | | | |
| Naphthalene | 18,667 | <4.9 | | <5.0 | | | | | | | |
| Nitrobenzene | 467 | <9.9 | | <10 | | | | | | | |
| N-nitrosodimethylamine | 0.03 | <0.18 | | <1.6 | | | | | | | |
| N-nitrosodipropylamine | 88,667 | <9.9 | | <10 | | | | | | | |
| N-nitrosodiphenylamine | n/a | <9.9 | | <10 | | | | | | | |
| Phenanthrene | n/a | <4.9 | | <5.0 | | | | | | | |
| Pyrene | 28,000 | <4.9 | | <5.0 | | | | | | | |
| 1,2,4-trichlorobenzene | 9,333 | <9.9 | | <10 | | | | | | | |
| Pesticides (ug/L) | | | | | | | | | | | |
| Aldrin | <0.003 ^{Note9} | <0.099 | | <0.10 | | | | | | | |
| Alpha-BHC | n/a | <0.099 | | <0.10 | | | | | | | |
| Beta-BHC | n/a | <0.099 | | <0.10 | | | | | | | |
| Gamma-BHC | n/a | <0.099 | | <0.10 | | | | | | | |
| Delta-BHC | n/a | <0.099 | | <0.10 | | | | | | | |
| Chlordane (alpha, gamma) | 3.2 | <0.099 | | <0.10 | | | | | | | |
| 4,4'-DDT | n/a | <0.099 | | <0.10 | | | | | | | |
| 4,4'-DDE | n/a | <0.099 | | <0.10 | | | | | | | |
| 4,4'-DDD | n/a | <0.099 | | <0.10 | | | | | | | |
| Dieldrin | <0.003 ^{Note9} | <0.099 | | <0.10 | | | | | | | |
| Alpha-endosulfan (Endosulfan I) | n/a | <0.099 | | <0.10 | | | | | | | |
| Beta-endosulfan (Endosulfan II) | n/a | <0.099 | | <0.10 | | | | | | | |
| Endosulfan sulfate | 3 | <0.099 | | <0.10 | | | | | | | |
| Endrin | 0.004 | <0.099 | | <0.10 | | | | | | | |
| Endrin aldehyde | 0.7 | <0.099 | | <0.10 | | | | | | | |
| Heptachlor | 0.9 | <0.099 | | <0.10 | | | | | | | |
| Heptachlor epoxide | 0.9 | <0.099 | | <0.10 | | | | | | | |
| PCB-1016 (Aroclor 1016) | n/a | <0.99 | | <1.0 | | | | | | | |
| PCB-1221 (Aroclor 1221) | n/a | <0.99 | | <1.0 | | | | | | | |
| PCB-1232 (Aroclor 1232) | n/a | <0.99 | | <1.0 | | | | | | | |
| PCB-1242 (Aroclor 1242) | n/a | <0.99 | | <1.0 | | | | | | | |
| PCB-1248 (Aroclor 1248) | n/a | <0.99 | | <1.0 | | | | | | | |
| PCB-1254 (Aroclor 1254) | n/a | <0.99 | | <1.0 | | | | | | | |
| PCB-1260 (Aroclor 1260) | n/a | <0.99 | | <1.0 | | | | | | | |
| Toxaphene | 0.005 | <0.99 | | <1.0 | | | | | | | |

This table was generated to assist in the review of constituents that vary with hardness or pH, according to the Surface Water Quality Standards.

Notes from Samples at all Sites for Constituents Standards that vary based on Hardness or pH

| SWQS for constituents (ug/L) for Hardness Range (mg/L) of: | Min 16 | Max 180 | SWQS Table |
|---|-----------|------------|---------------|
| Cadmium - Note 1 | 3.83 | 40.37 | 6 |
| Copper - Note 2 | 2.39 | 23.38 | 10 |
| Lead - Note 3 | 17.69 | 256.85 | 15 |
| Nickel - Note 5 | 882 | 6,837 | 18 |
| Silver - Note 6 | 0.14 | 8.84 | 19 |
| Zinc - Note 7 | 235 | 1830 | 21 |

| Hardness Range of All Samples | |
|----------------------------------|-----|
| Min | Max |
| 16 | 180 |

| pH Range of All Samples | |
|----------------------------|------|
| Min | Max |
| 5 | 8.61 |

| For pH Range of | Min 6.3 | Max 8.61 | SWQS Table |
|----------------------------|------------|-------------|---------------|
| Pentachlorophenol - Note 8 | 18.191 | 183.534 | 24 |

SWQS are for dissolved
Assume 1:1 ratio

| Sum | |
|----------------------------|-------------|
| Aldrin + Dieldrin - Note 9 | <0.003 ug/L |

SWQSAAC Title 18, Ch. 11
Surface Water Quality Standards

For example, the range of hardness at all of the sites is 16 to 180 mg/L. Table 6 of the SWQS shows the standard for cadmium at a hardness of 16 is 3.83 ug/L. Similarly, the standard for cadmium at a hardness of 180 mg/L is 40.37 ug/L. The SWQS for cadmium, copper, lead, nickel, silver and zinc, are all based on hardness. Similarly, pentachlorophenol SWQS is based on pH. Further discussion can be found in Part 10.

PART 10 ASSESSMENT OF MONITORING DATA

I. Stormwater Quality

This report is the second of a five year permit. The sampling results are similar to those submitted last year and in last permitting term. Sampled stormwater exhibited typical constituent concentrations for stormwater runoff from an arid or semi-arid southwestern city. This fiscal year's samples were well within the historical range of sampling data collected in earlier permit reporting periods.

This is the second year of sampling under this permit. The sample results from the first winter and summer, and last winter are completed, but those from this summer are not, so there are not enough sample results to compare. So far, all results seem within reasonable ranges (no flyers).

II. Water Quality Standards (WQS)

The surface water quality standards are listed in the tables found in Part 9 and Part 10 III (below). All sites were well below the surface water quality standards excluding those listed and discussed in Part 10. III.

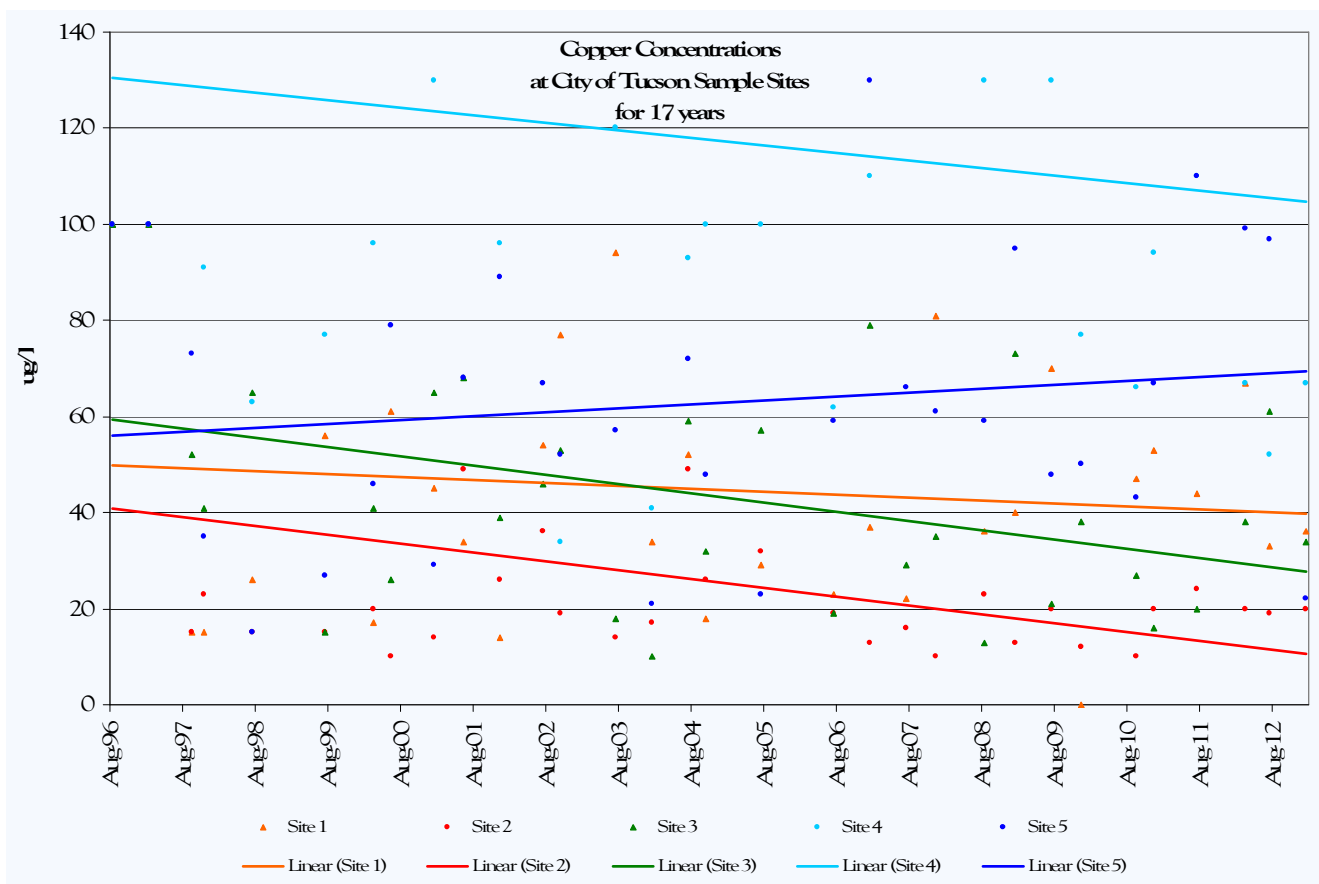
III. Exceeding Water Quality Standards (WQS)

In the last annual report we believed that Sites 1, 3, and 4 exceeded the surface water quality standard for lead and nothing else. However, we now have a better understanding of the Surface Water Quality Standards (SWQS) in A.A.C Title 18 Chapter 11 and have learned that we did not exceed the standards in lead but we did in other constituents. They are summarized in the tables below.

The cause of the *E.coli* is suspected to be from birds (aves), cat (feline) and dog/coyote (canine) droppings.

The concentration of copper exceeded the SWQS in all sample sites. A review was performed to compare the results since 1996 (see below). The results that were below the detection limit of the laboratory equipment (less than) were reported for this report as the value. For example, <0.1 was reported as 0.1 rather than 0. Therefore the actual value is lower than what is graphed below. There was a lot of scatter in the data, yet trend lines indicate the copper concentration is declining at most of the sites or the laboratory detection/reporting limits are getting lower. It appears from the data since 1996 that the copper concentrations, on the most part, have not changed. However, the trend line of Site 5 is increasing. Staff combed through all the sites trying to determine the cause of the copper in the stormwater without success.

Research indicated the copper likely is from native background in soils and landscape material. Additionally, research suggests brake dust from automobiles can contribute to copper residual found in stormwater. Stormwater staff could not find the source(s) of copper, so the City decided to do a test on Site 4 to see if the copper concentration would be reduced with street sweeping. Since Site 4 showed higher copper concentrations than the other sites, all of the streets in Site 4's watershed were swept on August 17, 2013 in effort to clean the copper before it was sample on September 6, 2013. The sample results should be ready soon and will be discussed in the next annual report. Additionally, all of the businesses that may use copper that are in Site 4's watershed may be contacted and inspected to determine if copper could be originating from their facility.



In a number of samples, the laboratory could not measure as low as the SWQS's for a number of constituents. They were: copper, silver, pentachlorophenol, cyanide, benzo(a)anthracene, benzo(a)pyrene, benzo(k)fluoranthene, 1,2-diphenylhydrazine, n-nitrosodimethylamine, aldrin, dieldrin, endrin, and toxaphene.

| Site ID: 1 Grant/Wilson | | | Winter 2011-12 | Summer 2012 | Winter 2012-13 | | | | | | | | | |
|-------------------------------|--|--|-------------------|----------------|-------------------|------|--|--|--|--|--|--|--|--|
| Sample Date: | | | 11/7/11 | 7/20/12 | 12/19/12 | | | | | | | | | |
| Receiving Water: Rillito | | | Hardness | 60 | 48 | 53 | | | | | | | | |
| Copper | Note 2 (Table 12) SWQS (ug/L) Dissolved | | 13.87 | 11.17 | 12.30 | | | | | | | | | |
| | Value (ug/L) Total | | 87 | 50 | 33 | | | | | | | | | |
| | Assume 1:1 Ratio Total to Dissolved | | 43.5 | 25 | 16.5 | | | | | | | | | |
| | Exceed Copper Standard? | | Yes | Yes | Yes | | | | | | | | | |
| Lead | Note 3 (Table 15) SWQS (ug/L) Dissolved | | 77.83 | 60.78 | 67.85 | | | | | | | | | |
| | Value (ug/L) Total | | 21 | 8.6 | 14 | | | | | | | | | |
| | Assume 1:1 Ratio Total to Dissolved | | 10.5 | 4.3 | 7 | | | | | | | | | |
| | Exceed Lead Standard? | | No | No | No | | | | | | | | | |
| Silver | Note 6 (Table 19) SWQS (ug/L) Dissolved | | 1.34 | 0.91 | 1.08 | | | | | | | | | |
| | Value (ug/L) Total | | 0.46 | 0.87 | 0.067 | | | | | | | | | |
| | Assume 1:1 Ratio Total to Dissolved | | 0.23 | 0.435 | 0.0335 | | | | | | | | | |
| | Exceed Silver Standard? | | No | No | No | | | | | | | | | |
| | | | pH | 7.07 | | 8.55 | | | | | | | | |
| PCP | Note 8 (Table 24) SWQS (ug/L) Dissolved | | 40 | | 166 | | | | | | | | | |
| | Value (ug/L) Total | | 29 | | 29 | | | | | | | | | |
| | Exceed Pentachlorophenol Standard? | | No | | No | | | | | | | | | |
| Aldrin/Dieldrin | Aldrin | | <0.097 | | <0.098 | | | | | | | | | |
| | Dieldrin | | <0.097 | | <0.098 | | | | | | | | | |
| | Note 9 SWQS Aldrin + Dieldrin < 0.003 ug/L | | <0.194 | | <0.292 | | | | | | | | | |
| | Exceed Aldrin/Dieldrin Standard? | | Unk | | Unk | | | | | | | | | |
| | E.coli | | 2400 | 2000 | 2400 | | | | | | | | | |
| Exceed E.coli Standard (575)? | | | Yes | Yes | Yes | | | | | | | | | |

| Site ID: 2 Greenlee | | | Winter 2011-12 | Summer 2012 | Winter 2012-13 | | | | | | | | | | |
|-------------------------------|--|--|-------------------|----------------|-------------------|----|--|--|--|--|--|--|--|--|--|
| Sample Date: | | | 3/18/12 | 7/15/12 | 12/6/13 | | | | | | | | | | |
| Receiving Water: Rillito | | | Hardness | 30 | 27 | 16 | | | | | | | | | |
| Copper | Note 2 (Table 12) SWQS (ug/L) Dissolved | | 7.48 | 6.77 | 4.14 | | | | | | | | | | |
| | Value (ug/L) Total | | <20 | 19 | <20 | | | | | | | | | | |
| | Assume 1:1 Ratio Total to Dissolved | | <10 | 9.5 | <10 | | | | | | | | | | |
| | Exceed Copper Standard? | | Unk | Yes | Unk | | | | | | | | | | |
| Lead | Note 3 (Table 15) SWQS (ug/L) Dissolved | | 35.96 | 31.95 | 17.69 | | | | | | | | | | |
| | Value (ug/L) Total | | 0.96 | 2.7 | 1.4 | | | | | | | | | | |
| | Assume 1:1 Ratio Total to Dissolved | | 0.48 | 1.35 | 0.7 | | | | | | | | | | |
| | Exceed Lead Standard? | | No | No | No | | | | | | | | | | |
| Silver | Note 6 (Table 19) SWQS (ug/L) Dissolved | | 0.41 | 0.34 | 0.14 | | | | | | | | | | |
| | Value (ug/L) Total | | <10 | 0.99 | 0.014 | | | | | | | | | | |
| | Assume 1:1 Ratio Total to Dissolved | | <5 | 0.495 | 0.007 | | | | | | | | | | |
| | Exceed Silver Standard? | | Unk | Yes | No | | | | | | | | | | |
| pH | | | 7.97 | | 6.3 | | | | | | | | | | |
| PCP | Note 8 (Table 24) SWQS (ug/L) Dissolved | | 100 | | 18 | | | | | | | | | | |
| | Value (ug/L) Total | | 29 | | <30 | | | | | | | | | | |
| | Exceed Pentachlorophenol Standard? | | No | | Unknown | | | | | | | | | | |
| Aldrin/Dieldrin | Aldrin | | <0.097 | | <0.099 | | | | | | | | | | |
| | Dieldrin | | <0.097 | | <0.099 | | | | | | | | | | |
| | Note 9 SWQS Aldrin + Dieldrin < 0.003 ug/L | | <0.194 | | <0.198 | | | | | | | | | | |
| | Exceed Aldrin/Dieldrin Standard? | | Unk | | Unk | | | | | | | | | | |
| E.coli | | | 87 | 2400 | 770 | | | | | | | | | | |
| Exceed E.coli Standard (575)? | | | No | Yes | Yes | | | | | | | | | | |

| | | | | | | | | | | | | |
|-----------------------------------|--|----------|---------|---------|---------|--|--|--|--|--|--|--|
| Site ID 5 Limberlost/1 rst | | Winter | Summer | Winter | | | | | | | | |
| Sample Date: | | 2011-12 | 2012 | 2012-13 | | | | | | | | |
| Receiving Water: Rillito | | Hardness | 2/14/12 | 7/10/12 | 12/6/13 | | | | | | | |
| Copper | Note 2 (Table 12) SWQS (ug/L) Dissolved | 23.26 | 21.50 | 7.01 | | | | | | | | |
| | Value (ug/L) Total | 99 | 97 | 22 | | | | | | | | |
| | Assume 1:1 Ratio Total to Dissolved | 49.5 | 48.5 | 11 | | | | | | | | |
| | Exceed Copper Standard? | Yes | Yes | Yes | | | | | | | | |
| Lead | Note 3 (Table 15) SWQS (ug/L) Dissolved | 136.3 | 124.45 | 33.28 | | | | | | | | |
| | Value (ug/L) Total | 0.04 | 40 | 12 | | | | | | | | |
| | Assume 1:1 Ratio Total to Dissolved | 0.02 | 20 | 6 | | | | | | | | |
| | Exceed Lead Standard? | No | No | No | | | | | | | | |
| Silver | Note 6 (Table 19) SWQS (ug/L) Dissolved | 3.22 | 2.79 | 0.36 | | | | | | | | |
| | Value (ug/L) Total | <10 | <10 | 0.013 | | | | | | | | |
| | Assume 1:1 Ratio Total to Dissolved | <5 | <5 | 0.0065 | | | | | | | | |
| | Exceed Silver Standard? | Unk | Unk | No | | | | | | | | |
| pH | | 7.75 | | 6.5 | | | | | | | | |
| PCP | Note 8 (Table 24) SWQS (ug/L) Dissolved | 100 | | 22 | | | | | | | | |
| | Value (ug/L) Total | 30 | | <30 | | | | | | | | |
| | Exceed Pentachlorophenol Standard? | No | | Unk | | | | | | | | |
| Aldrin/Dieldrin | Aldrin | <0.099 | | <0.10 | | | | | | | | |
| | Dieldrin | <0.099 | | <0.10 | | | | | | | | |
| | Note 9 SWQS Aldrin + Dieldrin < 0.003 ug/L | <0.198 | | <0.20 | | | | | | | | |
| | Exceed Aldrin/Dieldrin Standard? | Unk | | Unk | | | | | | | | |
| E.coli | | 93 | 2400 | 2400 | | | | | | | | |
| Exceed E.coli Standard (575)? | | No | Yes | Yes | | | | | | | | |

PART 11 ESTIMATES OF ANNUAL POLLUTANT LOADINGS

To estimate the annual pollutant load, rainfall totals are collected at each of the five stations, tabulated monthly, and used to calculate the event mean concentration for constituents monitored under the City's MS4 permit, along with the pollutant loading calculations.

Laboratories report constituent values that were below the detection limit as less than the minimum Practical Quantitation Limit (<PQL) or the Minimum Detection Limit (MDL). These values are reported as zero for calculating purposes.

Runoff volumes were calculated for each drainage area, utilizing the area and impervious fraction developed by Pima County Flood Control District specifically for the Tucson metropolitan area, along with rainfall data collected at each sample site. Runoff volumes are shown in Table 11.3.

Annual pollutant load estimates were developed in accordance with guidance found in the EPA's "Guidance Manual for the Preparation of Part 2 of the NPDES Permit Applications for Discharges from Municipal Separate Storm Sewer Systems." The simple method described in this document was followed. This method involves using the event mean concentrations and multiplying by the runoff volumes for each watershed. The following formula was used to determine the annual load of each pollutant for each drainage basin:

$$L = (R)(C)(A)(N)$$

$$V = (R)(A)$$

L = Pollutant load (tons/year).

R = Runoff (inches)

C = Pollutant concentration (mg/L)

A = Area (acres)

N = Conversion (1.65×10^{-3})

V = Volume of runoff (acre-feet).

$$R = (P)(P_j)(R_v)$$

P = Rainfall (inches)

P_j = Fraction of annual rainfall events that produce runoff

R_v = Runoff coefficient

I_a = Impervious fraction

$$R_v = 0.05 + 0.9(I_a)$$

P is obtained from raw data collected from sample sites where P_j is calculated from actual rain events at sample sites that produce flow for the winter and summer season.

Table 11.1
Average Annual Load for the City of Tucson's Monitoring Program 2011 – 2016

| ng/L | TDS | TSS | BOD | COD | N | TKN | PO ₄ |
|------|-----|-----|-----|-----|-----|-----|-----------------|
| 2012 | 123 | 156 | 42 | 195 | 1.1 | 4.7 | 0.4 |
| 2013 | 40 | 95 | 19 | 80 | 0.2 | 0.8 | 0.2 |
| 2014 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | 0.0 |
| 2015 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | 0.0 |
| 2016 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | 0.0 |

| ug/L | Sb | As | Ba | Be | Cd | Cr | Cu | Pb | Hg | Ni | Se | Ag | Tl | Zn |
|------|-----|-----|----|-----|-----|----|----|----|-----|----|-----|-----|-----|-----|
| 2012 | 1.7 | 2.0 | 86 | 0.0 | 0.2 | 3 | 57 | 14 | 0.0 | 4 | 0.2 | 0.4 | 0.0 | 244 |
| 2013 | 0.7 | 0.0 | 39 | 0.0 | 0.0 | 0 | 26 | 8 | 0.0 | 0 | 0.4 | 0.0 | 0.0 | 94 |
| 2014 | 0.0 | 0.0 | 0 | 0.0 | 0.0 | 0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.0 | 0 |
| 2015 | 0.0 | 0.0 | 0 | 0.0 | 0.0 | 0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.0 | 0 |
| 2016 | 0.0 | 0.0 | 0 | 0.0 | 0.0 | 0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.0 | 0 |

Table 11.2a
Drainage Characteristics

| Drainage Basin | Area (sq mi) "A" | Impervious Fraction "I" | Rv no units | Total Runoff (Acre-Ft) |
|-------------------------------------|---------------------|-------------------------------|-------------|------------------------------|
| SANTA CRUZ RIVER | 142.96 | 8.72 | 8.95 | 6,187 |
| RILLITO CREEK | 19.73 | 0.22 | 4.28 | 1,460 |
| PANTANO WASH | 29.06 | 0.08 | 2.44 | 757 |
| TANQUE VERDE CREEK | 10.91 | 0.16 | 1.74 | 532 |
| SABINO CREEK | 0.6 | 0.43 | 0.26 | 25 |
| Atterbury Wash (into Lakeside Lake) | 11.66 | 0.06 | 0.10 | 47 |

Table 11.2b
Total Runoff "V" (acre-feet)

| | Winter 2011-12 | Summer 2012 | Winter 2012-13 | Summer 2013 | Winter 2013-14 | Summer 2014 | Winter 2014-15 | Summer 2015 | Winter 2015-16 | Summer 2016 |
|--------------------|-------------------|----------------|-------------------|----------------|-------------------|----------------|-------------------|----------------|-------------------|----------------|
| Santa Cruz River | 6,187 | 8,809 | 5,548 | | | | | | | |
| Rillito Creek | 1,460 | 2,080 | 1,310 | | | | | | | |
| Pantano Wash | 757 | 1,078 | 679 | | | | | | | |
| Tanque Verde Creek | 532 | 758 | 477 | | | | | | | |
| Sabino Creek | 25 | 35 | 22 | | | | | | | |
| Total (City Wide) | 8,961 | 12,760 | 8,037 | | | | | | | |

Table 11.3
Drainage Basin Sizes, Impervious Fraction, and Rv

| Drainage Basin | Area (sq mi) "A" | Impervious Fraction "I" | Rv no units |
|-----------------------------------|---------------------|-------------------------------|----------------|
| SANTA CRUZ RIVER | 142.96 | 8.72 | 8.95 |
| Silvercroft Wash (DL) | 13.44 | 0.12 | 0.16 |
| West Branch Santa Cruz River (CG) | 10.22 | 0.08 | 0.12 |
| Hughes Wash (AC) | 8.33 | 0.42 | 0.43 |
| El Vado Wash (AG) | 2.29 | 0.36 | 0.37 |
| Santa Clara Wash (AH) | 0.39 | 0.26 | 0.28 |
| Valencia Wash (AL) | 1.64 | 0.42 | 0.43 |
| Airport Wash (AW) | 24.17 | 0.09 | 0.13 |
| Wyoming Wash (BC) | 0.7 | 0.25 | 0.28 |
| Irvington Wash (BL) | 0.25 | 0.25 | 0.28 |
| Rodeo Wash (BR) | 8.39 | 0.21 | 0.24 |
| Tucson Diversion Channel (BW) | 43.53 | 0.20 | 0.23 |
| Mission View Wash (CC) | 1.62 | 0.48 | 0.48 |
| 18th Street Wash (CL) | 3.59 | 0.42 | 0.43 |
| Cushing Street Wash (CR) | 0.5 | 0.57 | 0.56 |
| Downtown Wash (CT) | 0.31 | 0.85 | 0.82 |
| Arroyo Chico (CW) | 11.17 | 0.52 | 0.52 |
| West University Wash (DA) | 0.76 | 0.63 | 0.62 |
| Bronx Wash (DC) | 1.26 | 0.50 | 0.50 |
| Grant Road Wash (DD) | 0.77 | 0.69 | 0.67 |
| Kruerger Wash (DF) | 0.38 | 0.46 | 0.46 |
| Flowing Wells Wash (DG) | 6.47 | 0.42 | 0.43 |
| Ruthrauff Wash (EG) | 2.78 | 0.52 | 0.52 |
| RILLITO CREEK | 19.73 | 0.22 | 4.28 |
| Stone Avenue Wash (HG) | 0.6 | 0.61 | 0.60 |
| First Avenue Wash (GR) | 0.5 | 0.37 | 0.38 |
| North Mountain Avenue Wash (GQ) | 0.62 | 0.25 | 0.28 |
| Tucson General Wash (GM) | 0.42 | 0.34 | 0.36 |
| Christmas Wash (GL) | 3.28 | 0.45 | 0.46 |
| Alvernon Wash (GG) | 3.24 | 0.54 | 0.54 |
| Christopher City Wash (GF) | 0.21 | 0.49 | 0.49 |
| Alamo Wash (GC) | 9.81 | 0.46 | 0.46 |
| Swan Road Wash (GD) | 0.52 | 0.42 | 0.43 |
| Creekside Wash (GE) | 0.53 | 0.27 | 0.29 |

Table 11.3 continued
Drainage Basin Sizes, Impervious Fraction, and Rv

| Drainage Basin | Area (sq mi) "A" | Impervious Fraction "I" | Rv no units |
|---------------------------|---------------------|-------------------------------|----------------|
| PANTANO WASH | 29.06 | 0.08 | 2.44 |
| Rose Hill Wash (UL) | 2.11 | 0.49 | 0.49 |
| Guillermo Wash (UZ) | 0.75 | 0.42 | 0.43 |
| Atterbury Wash (UG) | 16.71 | 0.06 | 0.10 |
| Mesquite Ranch Wash (UN) | 1.15 | 0.05 | 0.10 |
| Civano Wash (UR) | 3.07 | 0.05 | 0.10 |
| Owens Park Wash (UJ) | 0.75 | 0.35 | 0.37 |
| Rolling Hills Wash (UC) | 1.17 | 0.39 | 0.40 |
| Eastview Wash (TW) | 0.75 | 0.17 | 0.20 |
| Spanish Trail Wash (TR) | 1.46 | 0.10 | 0.14 |
| Escalante Wash (TL) | 1.14 | 0.08 | 0.12 |
| TANQUE VERDE CREEK | 10.91 | 0.16 | 1.74 |
| Udall Park Wash (MD) | 1.03 | 0.35 | 0.37 |
| Robb Wash (MW) | 3.51 | 0.31 | 0.33 |
| Este Wash (MG) | 2.49 | 0.30 | 0.32 |
| Wrightstown Wash (ML) | 0.67 | 0.19 | 0.22 |
| Reyes Wash (MC) | 1.18 | 0.17 | 0.20 |
| Hidden Hills Wash (MR) | 2.03 | 0.28 | 0.30 |
| SABINO CREEK | 0.6 | 0.43 | 0.26 |
| Fahringer Wash (MN) | 0.6 | 0.23 | 0.26 |

Table 11.4
Annual Pollutant Loading for the City of Tucson's Monitoring Program
Annual Pollutant Load (tons/rainy season)

| | Winter 2011-12 | Summer 2012 | Winter 2012-13 | Summer 2013 | Winter 2013-14 | Summer 2014 | Winter 2014-15 | Summer 2015 | Winter 2015-16 | Summer 2016 |
|------------------------|-------------------|----------------|-------------------|----------------|-------------------|----------------|-------------------|----------------|-------------------|----------------|
| Total Runoff (Acre-Ft) | 8,961 | 12,760 | 8,037 | | | | | | | |
| TDS | 2,106 | 2,172 | 1,049 | | | | | | | |
| TSS | 1,839 | 3,952 | 2,532 | | | | | | | |
| BOD | 569 | 974 | 499 | | | | | | | |
| COD | 3,246 | 3,581 | 2,136 | | | | | | | |
| N | 15 | 21 | 6 | | | | | | | |
| TKN | 50 | 127 | 21 | | | | | | | |
| PO ₄ | 6 | 10 | 6 | | | | | | | |
| Sb | 0.0 | 0.0 | 0.0 | | | | | | | |
| As | 0.0 | 0.1 | 0.0 | | | | | | | |
| Ba | 1.2 | 2.0 | 1.0 | | | | | | | |
| Be | 0.0 | 0.0 | 0.0 | | | | | | | |
| Cd | 0.0 | 0.0 | 0.0 | | | | | | | |
| Cr | 0.0 | 0.1 | 0.0 | | | | | | | |
| Cu | 0.9 | 1.1 | 0.7 | | | | | | | |
| Pb | 0.2 | 0.3 | 0.2 | | | | | | | |
| Hg | 0.0 | 0.0 | 0.0 | | | | | | | |
| Ni | 0.0 | 0.2 | 0.0 | | | | | | | |
| Se | 0.0 | 0.0 | 0.0 | | | | | | | |
| Ag | 0.0 | 0.0 | 0.0 | | | | | | | |
| Tl | 0.0 | 0.0 | 0.0 | | | | | | | |
| Zn | 4.3 | 4.3 | 2.5 | | | | | | | |

PART 12 ANNUAL EXPENDITURES

Expenditures for the many components of the City's Stormwater Program are funded by City Departments and through City membership, sponsorship and contributions to agencies such as Tucson Clean and Beautiful, Pima Association of Governments, and the University of Arizona. The majority of funds expended on programs benefiting stormwater quality come from the City's General Fund. Two City Departments are enterprise funded and many of their costs are not reflected in the table below. It is recognized that a number of costs associated with stormwater protection are not readily available and staff are working toward identifying and developing a tracking mechanism to estimate the costs.

An estimate of annual expenditures for programs with direct stormwater quality benefit is provided in the Table 12.1 below:

Table 12.1

| STORMWATER MANAGEMENT PRACTICE OR ACTIVITY | | 2011-12 | 2012-13 | 2013-14 | 2014-15 | 2015-16 |
|---|--|--------------|-------------|---------|---------|---------|
| I | Public Awareness | \$4,794,132* | \$9,957 | | | |
| II | Public Involvement | \$870,366 | \$803,299 | | | |
| III | IDDE | \$375,875 | \$812,842 | | | |
| IV | Municipal Facility Stormwater | \$1,065,122 | \$1,424,474 | | | |
| V | Industrial Stormwater | \$27,943 | \$35,630 | | | |
| VI | Construction Stormwater | \$270,573 | \$448,406 | | | |
| VII | Post-Construction Stormwater | VI above | VI above* | | | |
| VIII | Stormwater Sampling | \$24,719 | \$37,712 | | | |
| | Program Administration & Management | \$95,024 | \$274,259 | | | |
| Total Stormwater Expenditures | | \$7,523,754 | \$3,846,579 | | | |

*\$4,700,000 was from Tucson Water alone

PART 13 ATTACHMENTS

- Laboratory reports (attached)
- Pima Association of Governments Outreach Activities (attached)
- Drainage System Maps will be included in or by 4th year annual report
- List of major outfalls will be included in or by 4th year annual report
- List of changes to the major outfall inventory included in or by 4th year annual report
- New or revised ordinances -(next year “Green Streets”)
- New or revised public outreach documents (attached)